To: Hanson, Joshua[joshua.hanson@sol.doi.gov]
From: Bilbao, Anita
Sent: 2017-08-31T13:23:34-04:00
Importance: Normal
Subject: Fwd: GSENM Requested Maps
Received: 2017-08-31T13:24:40-04:00
GSENM List of Historic and Scientific Objects of Interest.xlsx
GSENM_DOIMemo_11.06.1998.pdf
GSENM_publications_as of_April 2016_Final.xlsx

2 of 3
---------- Forwarded message ----------
From: **Betenson, Matthew** <mbetenso@blm.gov>
Date: Wed, Aug 30, 2017 at 12:16 PM
Subject: Re: GSENM Requested Maps
To: Edwin Roberson <eroberso@blm.gov>
Cc: anita_bilbao@blm.gov, Brian Mueller <bmueller@blm.gov>, Cynthia Staszak <cstaszak@blm.gov>

Good morning Ed,

Attached is a set of documents to help with questions about Grand Staircase-Escalante National Monument's (GSNEM) object list and research work. The Memorandum from the Secretary to the BLM (GSENM DOIMemo 11.06.1998) clearly identified the List of Historic and Scientific Objects of Interest and it is broken into Geologic, Prehistoric, Historic, and Biological categories. This Memo also contains the Bibliography of Sources Concerning Objects. We consider these lists definitive for the establishment of GSENM. We also attached a separate spreadsheet of GSENM List of Historic and Scientific Objects of Interests from the Memo for easier copying and sharing.

This monument is almost 21 years old at this point, on-going research has provided additional information about some of objects, and resources contained within GSENM. Currently we have 604 entries of specific research at GSENM (GSENM publications as of April 2016 Final).

We are working on an updated/highlights list reflecting more the research and results that has occurred on GSENM objects. I expect to be able to send that early this afternoon.

Please let me know if you have any questions or need more information.

On Tue, Aug 29, 2017 at 5:04 PM, Betenson, Matthew <mbetenso@blm.gov> wrote:

> Good afternoon Ed,

To answer that question about the Paleo data, this map depicts the correct site potential information. It is from May, and I believe Brian and Paul (GSENM GIS) discussed the data for it in March.

The map was part of the initial data request on the Google Drive:

https://drive.google.com/drive/folders/0B_thpQJXu6O-SEtVLTc2NVMtVm8

We'll have the other information ready for you tomorrow.

On Tue, Aug 29, 2017 at 8:47 AM, Edwin Roberson <eroberso@blm.gov> wrote:

> Matt, I wanted to share the maps i sent back to D.C. As my note indicates, We will be overlaying the data themes on one map. Ed

Sent from my iPhone

Begin forwarded message:

> **From:** "Roberson, Edwin" <eroberso@blm.gov>
>
> **Subject: Fwd: GSENM Requested Maps**
>
> Here are maps with some of the individual data layers you were looking for. The first is Wilderness Study Areas. The second is Lands with Wilderness Character. There is still some project related LWC inventory work being done in the southwest portion of the monument so it will change. The last two maps show oil and gas and coal leases at the time the monument was established. We are will get mineral potential information tomorrow. The last map shows polygons depicting the landscape features/objects listed in the proclamation. Here are the objects/features.

(b) (5) DPP, (b) (5) ACP

(b) (5) DPP, (b) (5) ACP

[redacted]

When we get the mineral info we can produce a map with all four layers you requested. ed

--
Ed Roberson,
Utah BLM State Director
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--

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Grand Staircase-Escalante National Monument List of Historic and Scientific Objects

Object	Description	Location	Source
(b)(5) DPP	Perennial streams enter entrenched canyons in white Navajo and deep-red Windgate Sandstone. Deer Creek, Steep Creek, and The Gulch have perennial flows of clear, cold water. The Gulch leads up into the spectacular Circle Cliffs where remarkable specimens of petrified wood (60 ft logs) exist in the Morrison and Chinle formations.	Escalante - Stepp Creek WSA	UT BLM Statewide Final Wilderness EIS, 1990
	White Canyon cuts through the Kaibab Limestone to the Coconino Sandstone, the oldest stratum in the Upper Escalante drainage	Escalante-Studhorse Peaks Unit	of the Circle Cliffs Area, Garfield and Kane Counties, Utah, 1967. p. 10.
	Big Spencer Flat Road and V Road is site of "thunderball" iron concretions known as Moqui Marbles. These oddities weather out of the Navajo sandstone and are a popular recreation feature.	North Escalante Canyons WSA	Environmental Geologic Studies of the Kaiparowits Coal-Basin, Utah. P. 16, and UT BLM Statewide Final
	The Waterpocket Fold tops out at Deer Point (7,243 feet). Most of the Waterpocket Fold is in the Capitol Reef National Park where it is a major landmark.	Escalante-Cold Mesa unit	Coalition. Wilderness at the Edge. P. 189, and Davidson, E.S., Geology of the Circle Cliffs Area, Garfield and Kane Counties, Utah, 1967. p.
	The inner gorges of the Upper Moody Canyons cut into the relatively harder Kaibab Limestone and Coconino Sandstone (oldest exposed layer in this region).	Escalante-Cold Mesa unit	Utah Wilderness Coalition. Wilderness at the Edge. P. 189
	Dry Valley Creek Canyon: A waterfall blocks the entrance to Dry Valley Creek Canyon and consequently, the canyon remains in its natural condition. A perennial stream cuts through alluvial benches. It is a relict and probably possesses important scientific values.	Mud Springs Canyon WSA	UT BLM Statewide Final Wilderness EIS, 1990
	The East Kaibab Monocline or the Cockscomb is unique as a Colorado Plateau structure. Its alignment with the Paunsaugant, Sevier, and Hurricane faults suggest that it too could be a fault at depth. It extends from the Colorado River north to Canaan Peak and is a major landmark.	Kaiparowits Plateau - The Cockscomb WSA	UT BLM Statewide Final Wilderness EIS, 1990
	The Blues - a Cretaceous shale badlands, richly colored and contrasting with adjacent pink sandstone cliffs that forms a significant part of the vista for visitors to Bryce Canyon National Park. The Kaiparowits formation is well exposed here represents an accumulation of exceedingly rapid proportions and an immature sedimentary region which is not well displayed in any other formation in the Colorado Plateau.	The Blues WSA (near Bryce Canyon)	UT BLM Statewide Final Wilderness EIS, 1990
	Fiftymile Mountain is a complex of deep canyons, upwarps, monoclines, liogbacks and a spectacular 42-mile long Straight Cliffs wall, topping a thousand-foot-high cliff line of the Summerville, Morrison and Dakota formations. This complex marks the edge of the Kaiparowits Plateau.	Kaiparowits Plateau - Fiftymile Mountain WSA	UT BLM Statewide Final Wilderness EIS, 1990
	Ancient coal fires of Right Hand Collet Canyon have left surface remains in the form of clinkers and deep red ash. These remains dominate the visual character of the drainage.	Carcass Canyon WSA	UT BLM Statewide Final Wilderness EIS, 1990
	Arch Span of 40 feet located in Calf Canyon, and is visible from the Alvey Wash road.	Carcass Canyon WSA	UT BLM Statewide Final Wilderness EIS, 1990
	Burning Hills - naturally occurring underground coal fires have turned steep and rugged exposed hilltops a distinctive red.	Burning Hills WSA	UT BLM Statewide Final Wilderness EIS, 1990

List of Historic and Scientific Objects of Interest
GSENM 8-30-17

Object	Description	Location	Source
[redacted] (b)(5) DPP	Devils Garden - oddly shaped arches (including Metate Arch) and rock formations in the hills at the foot of the cliffs marking the Kaiparowits Plateau.	Carcass Canyon WSA	UT BLM Statewide Final Wilderness EIS, 1990
	This area possesses exceptional scenic values and contains a portion of the Cockscomb, a prominent southern Utah geologic feature. The Cockscomb forms 2 parallel knife-edged ridges with a bisection V-shaped trough. Flatirons, small monoliths, and other colorful formations are present on the west ridge. These major features of south central Utah cover over 4,000 acres.	Mud Spring WSA	UT BLM Statewide Final Wilderness EIS, 1990
	An interesting fold in Henrieville Creek along the northwest boundary of the WSA is of geologic interest and a sightseeing attraction.	Mud Spring WSA	UT BLM Statewide Final Wilderness EIS, 1990
	Window Wind Arch above the middle trail has scenic value because of its location on the very edge of the Straight Cliffs. The Straight Cliffs escarpment is major landmark in south-central Utah and an important scenic feature within view from the Hole-in-the-Rock road. Woolsey Arch is located in Rock Creek Basin, an area of colorful Navajo sandstone and high cliffs.	Fifty Mile Mountain WSA	UT BLM Statewide Final Wilderness EIS, 1990
	Unique because it consists of 2 prominent southern Utah physiographic systems. It includes the eastern most extension of the White Cliffs component of the famous ascending staircase, cliff and terrace physiography, the Vermillion, White, and Pink Cliffs; and east of the Paria river, the dividing point is the landscape representative of the Glen Canyon physiography of sculptured, dissected, and exposed Navajo sandstone . The area where these merge between Deer Range and Rock Springs Bench is a highly scenic complex and colorful landscape.	Paria-Hackberry WSA	UT BLM Statewide Final Wilderness EIS, 1990
	The Vermillion Cliffs with its associated Wingate Sandstone cliffs, colorful Chinle badlands, and canyons with there multiple colors and the intensity of coloration contribute to high scenic quality. Included in this landscape are Hackberry Canyon, Paria River Valley, Hogeye Canyon, the Pilot Ridge-Starlight Canyon-Kirbys Point area and Eight Mile Pass.	Paria-Hackberry WSA.	UT BLM Statewide Final Wilderness EIS, 1990
	An area of high scenic value include the breaks of the Rush Beds and the west wall of Cottonwood Canyon, upper tributaries to Hackberry Canyon, Death Valley Draw, and the exceptional Navajo Sandstone domes and fin formations on either side of lower Hackberry Canyon.	Paria-Hackberry WSA.	UT BLM Statewide Final Wilderness EIS, 1990
	Four ONA's designated to preserve "unique scenic values and natural wonders". North Escalante Canyon (5,800 acres), The Gulch (3,430), Escalante Canyons (480 acres), Phipps-Death Hollow (12 more outside WSA)	North Escalante Canyons WSA.	UT BLM Statewide Final Wilderness EIS, 1990
	This area is geologically complex and has some of the most outstanding canyon scenery in the country. Harris Wash a canyon of the classic Escalante River drainage canyon form with many entrenched meanders in the Navajo Sandstone.	North Escalante Canyons WSA.	UT BLM Statewide Final Wilderness EIS, 1990
	A unique feature of the Burning Hills is the red coloration in the landscape is the result of geological changes attributed to the naturally occurring coal fires. The coloration creates a highly scenic area.	Burning Hills WSA	UT BLM Statewide Final Wilderness EIS, 1990

Date Printed:

List of Historic and Scientific Objects of Interest
GSENM 8-30-17

Object	Description	Location	Source
[redacted] (b)(5) DPP	The White Cliffs are high white or yellow cliffs of Navajo Sandstone. Vary in height from 600' at Deer Springs Point bench to 1,200' at Deer Springs Point and the Sheep Creek-Bull Valley Gorge-Paria River confluence. The cliffs consistently reach a 1000' in height and the cliff line is interrupted by 8 canyons.	Paria-Hackberry WSA.	UT BLM Statewide Final Wilderness EIS, 1990
	This area contains twenty-four undeveloped springs. Ten are located in upper Paria, 6 in Hackberry, 5 on the eastern border of Cottonwood Creek, and 3 on west boundary. There are also 6 developed springs. These are significant features in this arid environment.	Paria-Hackberry WSA.	UT BLM Statewide Final Wilderness EIS, 1990
	Phipps-Death Hollow ONA {12/23/70) contains 34,288 acres managed to preserve scenic values and natural wonders.	Phipps-Death Hollow WSA.	UT BLM Statewide Final Wilderness EIS, 1990
	Arches. Peek-a-boo Rock, Wahweap Window, Jacob Hamblin Arch, Starlight Arch, Cobra Arch, Sam Pollack Arch, Woolsey Arch, and several more unnamed arches and natural bridges.	Kaiparowits Plateau and adjacent areas	Sargent, K.A., Environmental Geologic Studies of the Kaiparowits Coal-Basin, Utah.
	Sand-calcite crystals from the Morrison Formation. These crystals are the first reported occurrence from rocks of Jurassic age and only reported sand crystals in southern Utah.	Kaiparowits Plateau	Sargent, K.A., Environmental Geologic Studies of the Kaiparowits Coal-Basin, Utah.
	Circle Cliffs in the northeast portion of WSA features intensively colored red, orange, and purple Chinle mounds and ledges at the base of Wingate Sandstone cliffs. Vertically jointed cliffs banded with red, yellow, and white colors and bench tops and upper cliff faces possess innumerable orange-red Kayenta Sandstone knobs. One of most spectacular and distinctive landscapes on the Colorado Plateau.	Steep Creek WSA.	UT BLM Statewide Final Wilderness EIS, 1990
	Area includes Escalante Natural Bridge (130' high, 100 ' span) and 4 other natural bridges and arches.	Phipps-Death Hollow WSA.	UT BLM Statewide Final Wilderness EIS, 1990
	The Gulch is a major geologic feature. Deeply entrenched very sheer red straight line Wingate Sandstone walls. High ridges and slickrock peaks. Ridges drop fairly abruptly to canyons below.	Steep Creek WSA.	UT BLM Statewide Final Wilderness EIS, 1990
	Lamanite Natural Bridge. Actually a large arch with good symmetry and form. Located in an impressive setting in a deep side canyon to The Gulch.	Steep Creek WSA.	UT BLM Statewide Final Wilderness EIS, 1990
	Petrified wood. Upper Gulch-Circle Cliffs contains large, unbroken logs of petrified wood (NEA 2,213 acres). Maximum log length 36'. The scenic values of these logs is enhanced by their colorful surroundings.	Steep Creek WSA.	UT BLM Statewide Final Wilderness EIS, 1990
	Outstanding scenic values include the upper portion of Paradise Canyon where sandstone in the Wahweap Formation outcrops as colorful walls and cliffs. Ponderosa pine growing in the sandstone enhance the scenic values. Two sandstone monoliths or fins above Alvey Wash are prominent geological features.	Death Ridge WSA.	UT BLM Statewide Final Wilderness EIS, 1990

List of Historic and Scientific Objects of Interest
GSENM 8-30-17

Object	Description	Location	Source
[redacted] (b)(5) DPP	The area contains a unique canyon and bench system. The entire ISA contains outstanding scenery. Examples include the area east of Horse Canyon. Four canyons have isolated 10 benches of varying size . Many bench tops have intricate pattern of innumerable orange-red Kayenta Sandstone knobs. Wolverine Canyon and Death Hollow have extremely narrow and convoluted sections. Another feature, Harris Wash a canyon of the classic Escalante River drainage canyon form with many entrenched meanders in the Navajo Sandstone.	North Escalante Canyons/The Gulch ISA.	UT BLM Statewide Final Wilderness EIS, 1990
	Mollie's Nipple, an erosional remnant is a major landmark in the area.	Kaiparowitz Plateau.	UT BLM Statewide Final Wilderness EIS, 1990
	Natural Arches. Sam Pollock Arch, located at the head of a tributary drainage of Hackberry Canyon, and Starlight Arch located west of No Man's Mesa.	Paria-Hackberry WSA.	UT BLM Statewide Final Wilderness EIS, 1990
	Area of diverse geology represented by spectacular deep canyons. The Escalante River Canyon is 1100 feet deep. The canyon walls are rough and broken and the canyon is narrow and it meanders. Pure white to golden sandstone has been eroded into expanses of slickrock. Death Hollow Canyon is 1,000' feet deep and meandering . The extensive upper basin through which Mamie Creek flows is a extremely dissected area of canyons, tanks, other formations. Red layers of Carmel Formation cap high mesas and ledges of the exposed Kayenta Formation.	Phipps-Death Hollow WSA.	UT BLM Statewide Final Wilderness EIS, 1990
	Petrified wood deposits just west of the Old Paria Townsite and in Hackberry Canyon. Both are in the Chinle formation.	Paria-Hackberry WSA.	UT BLM Statewide Final Wilderness EIS, 1990
	All the topographic features of the Kaiparowits region have been developed in sedimentary rocks. The Kaiparowits Plateau is a slightly tilted sedimentary mass that extends as a narrow mesa from the High Plateaus to Glen Canyon 70 miles distant. Its culminating point, Canaan Peak is an outlier of the Table Cliff Plateau; the Paria Plateau is a huge block of sandstone, the Waterpocket monocline is a ridge of folded rock intricately dissected and flanked by hogbacks, and the broken "comb" in the vicinity of Paria is the edge of sandstone beds upturned in the East Kaibab fold. The Circle Cliffs are inward-facing walls of sandstone that rim an oval depression. These prominent features are but large-scale examples of the mesas, buttes, and ridges that characterize the landscape of southern Utah.	Kaiparowitz Plateau.	UT BLM Statewide Final Wilderness EIS, 1990
	Paria River from Colorado River to its source, identified by NPS as possessing values that may be of national significance, potential to be included in the National Wild and Scenic River System.	Paria-Hackberry WSA.	UT BLM Statewide Final Wilderness EIS, 1990
	Escalante River from Lake Powell to its source, a section of 14.9 miles, was designated as for study as a candidate Wild and Scenic River by the Secretary of the Interior on 10/11/70.	Phipps-Death Hollow WSA.	UT BLM Statewide Final Wilderness EIS, 1990

List of Historic and Scientific Objects of Interest
GSENM 8-30-17

Object	Description	Location	Source
(b)(5) DPP	Lower Calf Creek Falls. Calf Creek Canyon is characterized by red alcoved walls, 2 waterfalls, and extensive expanses of white slickrock. Lower Calf Creek Falls drops 126' and Upper Calf Creek's drop is 86'. High educational values associated with interpretation of these areas.	Phipps-Death Hollow WSA.	UT BLM Statewide Final Wilderness EIS, 1990
	The area contains 40 miles of perennial streams, a significant feature in this arid environment.	Phipps-Death Hollow WSA.	UT BLM Statewide Final Wilderness EIS, 1990
	Fossil assemblage photographs. Typical mollusks from Tropic Shale, south of Escalante include straight cone cephalopods, ammonites, gastropods, and pelecypods and Cretaceous sharks teeth from the Straight Cliffs Formation.	Kaiparowits Plateau	Sargent, K.A., Environmental Geologic Studies of the Kaiparowits Coal-Basin, Utah. pp 14-15.
	Gray Cliffs/Pink Cliffs - This sequence of rocks may contain one of the best and most continuous records of Late Cretaceous terrestrial life in the world. Formation has yielded early mammals, lizards, dinosaurs , crocodillians, turtles, mollusks.	Kaiparowits Plateau - The Blues WSA	BLM, Escalante/Kanab RMP - Grand Staircase Ecosystem Analysis, 1994
	Fossils deemed by the Museum of Northern Arizona in a 1976 study to be of major importance. They are found in the Cretaceous Wahweap Formation outcrops and include abundant fragments of turtle shells and dinosaurs, as well as several crocodile teeth. There is an excellent chance that mammal fossils will be found.	Kaiparowits Plateau - Nipple Bench Unit	BLM, Kaiparowits Power Project Environmental Impact Statement, 1976.
	The Straight Cliffs Formation is limited to the southern Utah area. It contains primitive mammals including one of the potentially oldest marsupial fossils identified.	Kaiparowits Plateau	BLM, Warm Springs Project Preliminary Draft EIS, 1996.
	Invertebrate and vertebrate specimens found Straight Cliffs, Tropic Shale, and Dakota Formations. 13 collection sites recorded (gastropods, cephalopods in upper Cretaceous Formations, vertebrate in Dakota and Tropic Shales). Likely to occur along entire length of the Straight Cliffs	Carcass Canyon WSA	Utah BLM Statewide Final Wilderness EIS, 1990.
	The Kaiparowits is of interest in understanding the evolution of mammals and other terrestrial vertebrates. Very little is known of Cretaceous mammals prior to the latest part of that period. The mid-Cretaceous mammalian twilight zone is spanned by the fossiliferous, terrestrial rock units of the Kaiparowits region. They contain unique evidence bearing on the early diversification of important mammalian groups of the Late Cretaceous. The thickness, continuity, and broad temporal distribution of the Kaiparowits sequence provides the opportunity to document changes in terrestrial vertebrate assemblages over a wide span of Late Cretaceous time.	Kaiparowits Plateau	Eaton, Jeffrey G, and Cifelli, Richard L. Preliminary report on Late Cretaceous mammals of the Kaiparowits Plateau, southern Utah, 1988
	Extremely significant fossils including marine and brackish water mollusks, turtles, crocodillians, lizards, dinosaurs, fishes, and mammals have been recovered from the Dakota formation, Tropic Shale, Straight Cliffs Formation (Tibbet Canyon, Smoky Hollow, and John Henry members), and Wahweap formation in the area around the proposed Andalex mine and some localities lie directly along the proposed haul routes. This sequence of rocks (including the overlying Wahweap and Kaiparowits formations) contain perhaps the best and most continuous record of Late Cretaceous terrestrial life in the world.	Kaiparowits Plateau	Eaton, Jeffrey G., Personal correspondence to Mr. Mike Noel, BLM, 1991

List of Historic and Scientific Objects of Interest
GSENM 8-30-17

Object	Description	Location	Source
(b)(5) DPP	Sixty sites have been recorded and the potential for additional sites is exceptionally high. Sites discovered to date include lithic scatters, 13 rockshelters (some w/storage cysts and rock art), 1 pithouse village site and 1 structure (probably of Anasazi origin). Some of the rock art and rock shelter and 1 campsite are potentially eligible for nomination to the NRHP.	North Escalante Canyons/The Gulch ISA	Utah BLM Statewide Final Wilderness EIS, 1990.
	Friendship Cove Pictograph site nominated to NRHP. This site consists of a set of large Fremont style pictographs painted on the face of a large sandstone cliff.	Phipps-Death Hollow ISA, eastern part	Utah BLM Statewide Final Wilderness EIS, 1990.
	Forty-four sites of diverse types have been recorded in the area. 14 rock art (petroglyph and pictographs sites (2 from Fremont culture)), 1 Pit-house village site, lithic scatters of Paiute and Anasazi , and 6 rockshelters have been discovered. Potential for more sites is good.	Phipps-Death Hollow ISA	Utah BLM Statewide Final Wilderness EIS, 1990.
	Situated at the intersection of three major prehistoric cultures the Plateau has long been a magnet for archeological study. It has been recognized that the Kaiparowits Plateau might contain important clues that would aid in answering questions in the archeology of the Southwest.	Kaiparowits Plateau	Utah Wilderness Coalition. Wilderness at the Edge. p. 147 and Lister, Florence C., Kaiparowits Plateau and Glen Canyon prehistory, an interpretation based on ceramics, 1964.
	Fiftymile Mountain Archeological District contains more than 400 sites including Anasazi habitations and granaries. Important scientific value. Some of the most significant cultural resources in the Four Corners area. Archaeological District (47,325 acre) has been nominated to NRHP. Majority of sites are masonry structures (of 1-10 rooms). Most are of Virgin Anasazi origin but include sites attributed to Fremont, Hopi, and Paiute. Navajo are also expected of occupying the area. 4,000 total sites may be located in WSA.	Fiftymile Mountain WSA	Utah BLM Statewide Final Wilderness EIS, 1990.
	Sixty-five sites have been recorded. They include lithic and ceramic scatters, masonry structures (granaries and storage cysts), one rock shelter. Masonry and some lithic/ceramic associated with Virgin Anasazi/Virgin-Kayenta Anasazi. Two are Pueblo 11-111 time period. Some sites are associated with Paiute-age or Archaic-age peoples. At least 8 sites in this area are eligible for nomination to the NRHP.	WahweapWSA	Utah BLM Statewide Final Wilderness EIS, 1990.
	High concentration of prehistoric sites. Although surveys are incomplete for the Warm Creek unit more that 600 sites have been found ranging from lithic scatters and campsites to rockshelters.	Kaiparowits Plateau/Warm Creek unit	BLM, Kaiparowits power project environmental impact statement, 1976.
	Part of a larger area extensively used by the Kayenta Anasazi and later the Southern Paiute Indians. Site densities expected to be moderate to high.	Kaiparowits Plateau/Squaw Canyon unit	ERT, 1980, Kaiparowits coal development and transportation study, final report.
	Prehistoric site densities are high on top of Nipple Bench. Sites represent Fremont, Virgin Anasazi and Kayenta Anasazi. The sites represent complex associations of features and artifacts and indicate permanent or extensive camps in rock shelters.	Kaiparowits Plateau/Nipple Bench unit	Fish, Paul, Preliminary Report Kaiparowits Power Project.
	Six sites have been recorded. One is Pueblo II Anasazi occupation site, with others unidentified.	Burning Hills WSA	Utah BLM Statewide Final Wilderness EIS, 1990.

List of Historic and Scientific Objects of Interest
GSENM 8-30-17

Object	Description	Location	Source
(b)(5) DPP	One hundred-five sites (primarily lithic scatters) have been recorded covering a broad period of occupation. Ten rockshelters w/storage cysts or storage caches, 1 w/masonry room, 3 w/granaries associated with Anasazi or Fremont have been discovered. Additional sites include petroglyph and pictograph panels associated with shelter sites and 1 burial site.	Carcass Canyon WSA	Utah BLM Statewide Final Wilderness EIS, 1990.
	One hundred thirty-four documented sites represent virtually all known prehistoric cultures in southern UT (Archaic, Fremont, Anasazi, Southern Paiute). 8,000 years of prehistory are represented. The sites primarily represent temporary habitation by hunter gatherers.	Death Ridge WSA	BIM Utah Statewide Wilderness EIS, 1990, and Hauck, F.R.,Cultural Resource Evaluation of South-Central Utah, 1977-1978.
	The area contains 41 recorded sites and based on surveys may contain exceptionally high densities of sites.. Known sites include rockshelters, pit houses, lithic scatters, and masonry structures. Pictograph panels are in Deer Creek Canyon and petroglyphs are found in Snake Creek Canyon. A study located and estimated 612 sites per 23,000 acres, 564 potentially eligible for nomination to the NRHP (southern border ofWSA). Another inventory estimated 360 sites per 23,000 acres at the northern border of the WSA.	Paria-Hackberry WSA	Utah BLM Statewide Final Wilderness EIS, 1990.
	The Kayenta Pueblo culture inhabiting the Straight Cliff and portions of the Escalante River drainage between AD. 1000 and 1200 were likely in contact with the Fremont culture. Although both inhabited the area at the same time and competed for limited agricultural lands there is no evidence of open conflict during this time. Some modifications of pottery making techniques between the two cultures indicates that there was trade and exchange between them. Little is known positively about the Kayenta culture, and additional research in this area could provide valuable insight on interactions between the two cultures.	Straight Cliffs WSA	Lister, Kaiparowits Plateau and Glen Canyon Prehistory: An interpretation based on ceramics. 1964.
	Dance Hall Rock/Hole-in-the-Rock Trail. While the Hole-in-the-Rock Trail was under construction in 1879, Mormon Pioneers camped at Fourtymile Spring and held meetings and dances in the shelter of Dance Hall Rock. Designated historical site by DOI 1970.	Two miles west of the Glen Canyon NRA on the Hole-in-the-Rock Trail	Utah Wilderness Coalition. Wilderness at the Edge. P 182.
	Historic route constructed in 1879 to provide access from Escalante to areas on the opposite side of the San Juan River in Southeast Utah.	Historic trail running from Escalante to Hole in the Rock in Glen Canyon NRA	Lambrechtse, Rudi. Hiking the Escalante, 1985.
	Boulder Mail Trail. Used to carry mail between Escalante and Boulder beginning in 1902. Much of trail still visible where necessary to construct through slickrock. Nominated to NRHP. Popular backpacking route.	Phipps-Death Hollow ISA	Utah BLM Statewide Final Wilderness EIS, 1990.
	Boynton Road. Constructed 1909 as short cut between Escalante and Salt Gulch. Abandoned after 2 years because of flooding . Visible over approx 9 of its 10 miles.	Phipps-Death Hollow ISA	Utah BLM Statewide Final Wilderness EIS, 1990.

List of Historic and Scientific Objects of Interest
GSENM 8-30-17

Object	Description	Location	Source
(b)(5) DPP [redacted] t	Escalante-Boulder telephone line: First Boulder-Escalante telephone line constructed by Forest Service in 1911 providing first phone service to area. Still visible between Antone Flat and Sand Creek.	Phipps-Death Hollow ISA	Utah BLM Statewide Final Wilderness EIS, 1990.
t	Washington Phipps grave. A historical grave site of an early pioneer shot in 1878 in a dispute with his partner John Boynton. Provided the namesake for the area.	Phipps-Death Hollow ISA	Lambrechtse, Rudi. Hiking the Escalante, 1985.
t	Old Boulder Road. Main route between Escalante and Boulder until the CCC built Hell's Backbone Road and Highway 12 in l 930's to replace it.	Phipps-Death Hollow ISA	Utah BLM Statewide Final Wilderness EIS, 1990.
t	The Hattie Green mine, an early copper working located on the crest of The Cockscomb.	The Cockscomb WSA	Utah BLM Statewide Final Wilderness EIS, 1990.
t	Old Paria Townsite was established in 1874 on the bench above the eastern bank of the Paria River by Mormon settlers who attempted to farm the bottomlands. Site was abandoned in 1890.	adjacent to Paria-Hackberry WSA	Abby, Edward and Hyde, Philip. Slickrock p.46.
t	Old Paria Townsite movie set. Built in the 1960's to film several movies. Now abandoned but still a popular recreation destination.	adjacent to Paria-Hackberry WSA	Abby, Edward and Hyde, Philip. Slickrock p.46.
	Riparian zones are corridors for many of the region's species, including neotripocal migrant birds. The corridors (including the Escalante, and Paria Rivers and Johnson Creek and their tributaries) bisect the region north to south allowing for exchange of individuals among different animal populations. The importance of movement corridors to the long term viability of animal populations is of great scientific and management interest. This area would afford many opportunities to enhance this ecological issue.	Entire monument proposal including the Escalante area, Kaiparowits Plateau, and areas west to Kanab including the Escalante, Paria rivers and Johnson Creek	Edwards, Tom, 1996; Knopf, 1985; Armbruster and Lande, 1993; Beier, 1993; Belovsky, 1987; Brown, 1971; Davidson et al., 1996; Diamond, 1981; Fahrig and Merriam, 1985; Frankel and Soule, 1981; Harris and Gallagher, 1989; Heaney, 1984; IUCN, 1978; Kushlan, 1979; Lomolino and Channell, 1995; Meffe and Carroll, 1994; Newmark, 1995; Noss, 1993; Patterson, 1984; Pickett and Thompson, 1978, Primack, 1993; Saunders et al., 1991; Shaffer, 1981; Soule, 1987; Soule and Wilcox, 1980; Wegner and Merriam, 1979; Wilcove et al., 1986; Willis, 1974.

Object	Description	Location	Source
[redacted]	25 miles of riparian corridor in unit. Connects mountains to desert lowlands. Has great concentration of hanging gardens and riparian vegetation, including relictual populations in canyon bottoms. Also supports many rock crevice communities. Connects other protected areas. High plant endemism, due to large extent of parent material exposure.	Escalante River	BLM Wilderness EIS; Knopf, 1985; Shulz, 1993; Armbruster and Lande 1993; Beier, 1993; Belovsky, 1987; Brown, 1971; Davidson et al., 1996; Diamond, 1981; Fahrig and Merriam, 1985; Frankel and Soule, 1981; Harris and Gallagher, 1989; Heaney, 1984; IUCN, 1978; Kushlan, 1979; Lomolino and Channell, 1995; Meffe and Carroll, 1994; Newmark, 1995; Noss, 1993; Patterson, 1984; Pickett and Thompson, 1978; Primack, 1993; Saunders et al., 1991; Shaffer, 1981; Soule, 1987; Soule and Wilcox, 1980; Wegner and Merriam, 1979; Wilcove et al., 1986; Willis, 1974.
	Riparian corridor links high country to lowland desert scrub. Connects protected areas. Has high concentrations of isolated communities: hanging garden, rock crevice and canyon bottom communities. Also has an abundance of packrat middens.	Paria River	Spaulding, 1979; BLM Wilderness EIS; Knopf, 1985; Shulz, 1993; Armbruster and Lande 1993; Beier, 1993; Belovsky, 1987; Brown, 1971; Davidson et al., 1996; Diamond, 1981; Fahrig and Merriam, 1985; Frankel and Soule, 1981; Harris and Gallagher, 1989; Heaney, 1984; IUCN, 1978; Kushlan, 1979; Lomolino and Channell, 1995; Meffe and Carroll, 1994; Newmark, 1995; Noss, 1993; Patterson, 1984; Pickett and Thompson, 1978; Primack, 1993; Saunders et al., 1991; Shaffer, 1981; Soule, 1987; Soule and Wilcox, 1980; Wegner and Merriam, 1979; Wilcove et al., 1986; Willis, 1974.
	Fifty miles of perennial streams including the Paria River (which is a wild and scenic river inventory segment). Riparian vegetation covers 500 acres.	Paria-Hackberry WSA	Utah BLM Statewide Final Wilderness EIS, 1990.

(b)(5) DPP

Object	Description	Location	Source
(b)(5) DPP	from the Mojave, Arizona deserts and northern Utah are all found here, with a few species from the Great Plains. The Colorado Plateau is surrounded by high mountains, isolating the flora and fauna. Unlike many ecosystems, the plant density, diversity and stature within the monument is determined more by substrate than climate. Consequently, isolation, plus the great diversity of substrates (providing a wider range of soil chemisty and physical characteristics) found within close proximity to each other has resulted in a high level of plant endemism in this area. Eleven species found in the monument are found nowhere else in the world. Of plants that occur only in Utah or on the Colorado Plateau, 125 pecies occur in the monument. The Canyonlands portion of the Colorado Plateau, much of which is contained in the monument, is considered the richest floristic region in the Intermountain West, and contains 50% of Utah's rare and endemic plants. 90% of these rare and endemic species are found on substrates typical of most of the monument. Of the Canyonlands area, the monument area is considered on of the most	Entire monument	Kaiparowits Power Project EIS; Axelrod, 1960; Utah Natural Heritage Program plant database; Nabhen and Wilson, 1996; Shulz, 1993; Albee et al., 1988; Welsh, 1974; Welsh et al. 1975; Hintze, 1988; Datt, 1996; Shreve, 1942; Cronquist et al., 1977; Utah Natural Heritage Program plant database.
	The Colorado Plateau was uplifted and downcut without deformation. As a consequence, large areas of unmixed geologic parent materials are exposed, and plants must adapt to large array of highly distinct parent materials. These substrates are sharply demarcated, and often occur within a few meters of each other. This situation offers the unique opportunity to examine the role of soil physical and chemical characteristics in determining plant and animal community structure independent of climatic variables, an important ecological question. It also results in different plant community structure and dynamics than is generally observed in other ecosystems. This area contains shales, siltstones, mudstones, sandstones and limestone of differing depths, and deposited in a variety of environments (marine, freshwater and eolian). Each soil depth and depositional environment has very different chemical and physical characteristics. As a result, there is a great diversity of substrates in this area, each supporting a unique plant community.	Entire monument	Hintze, 1988; Nabhen and Wilson, 1996; Gross, 1987; Dott, 1996; Roberts, 1987.
	The presence of steep elevational gradients gives the opportunity to sort out the role of temperature and precipitation in structuring plant and animal communities. Elevational gradients have traditionally been used by scientists as a way of examining factors controlling biotic community structure. Juxtaposition of diverse substrates and elevational gradients gives an unparalleled opportunity to determine the respective roles of soil chemistry, physical characteristics, elevation, rainfall and temperature in structuring biotic communities. In addition, it allows for high biodiversity in a small area.	Entire monument	Kaiparowits Power Project EIS; Axelrod, 1960; Utah Natural Heritage Program plant database; Nabhen and Wilson, 1996; Shulz, 1993; Albee et al., 1988; Welsh, 1974; Welsh et al. 1975; Hintze, 1988; Dott, 1996; Shreve, 1942; Cronquist et al., 1977

List of Historic and Scientific Objects of Interest
GSENM 8-30-17

Object	Description	Location	Source
(b)(5) DPP	The Escalante Plateau is the home to approximately 300 species of amphibians, birds, mammals, and reptiles. This diverse set of wildlife species includes over 20 species of birds of prey including the bald eagle, peregrine falcon, and was the historical range of the condor. The region contains 2 of the 7 recognized centers of endemism for fishes of the western United States.	Escalante Plateau	Davidson et al. 1996; Tom Edwards, 1996, Behnke, R.J., and Zar, M., 1976.
	Contains many different geologic substrates (therefore soils with different physical and chemical attributes) in a small area. The majority of endemic in Utah are found on these particular substrates; consequently, this area is expected to have a high concentration of endemics.	Escalante -along boundary of Glen Canyon NRA and Capital Reef National Park	Utah Natural Heritage Program plant database; Nabhen and Wilson, 1996; Shulz, 1993; Albee et al., 1988; Welsh, 1974; Welsh et al. 1975; Hintze, 1988.
	Large expanses of fine-textured soils (Morrison, Mancos/Tropic) shales support large number of endemic plant species, fossils.	Henrieville to Escalante	Hintze, 1988; Shulz, 1993; BLM Wilderness EIS.
	An exposed monocline with many soils/substrates in close juxtaposition provides tremendous biodiversity of both general and endemic flora. High salt content of stream provides habitat for salt-tolerated riparian plants. Provides a elevational gradient from ponderosa pine to desert scrub. In addition, the rocky substrate has provided refugia for many Arcto-Tertiary plants, providing a unique opportunity to examine the effects of ancient floral presence in the structuring of present-day plant communities. This area also supports a very high diversity of both general and endemic flora.	The Cockscomb	Hintze, 1988; Shulz, 1993; Albee et al., 1988; Axelrod, 1960; Welsh, 1978; Stevens, 1992; Dott, 1996.
	Contains a concentration of many different geologic substrates/soils with different physical and chemical attributes . This area has a high concentration of endemics. This boundary also abuts protected areas (Glen Canyon, Capitol Reef), thereby effectively increasing the value of all three areas for biological conservation. In addition, the Waterpocket Fold has isolated two outcrops of the same parent material. These two areas now support different floras. This presents an outstanding scientific opportunity to explore processes of speciation.	Far eastern boundary	1993; Albee et al., 1988; Axelrod, 1960; Welsh, 1978; Stevens, 1992; Dott, 1996; Armbruster and Lande, 1993; Fahrig and Merriam, 1985; Beier, 1993; Belovsky, 1987; Brown, 1971; Davidson et al. 1996; Diamond, 1981; Frankel and Soule, 1981; Harris and Gallagher, 1989; Heaney, 1984; IUCN, 1978; Kushlan, 1979; Lomolino and Channell, 1995; Meffe and Carroll, 1994; Newmark, 1995; Noss, 1993; Patterson, 1984; Pickett and Thompson, 1978; Primack, 1993; Saunders et al., 1991; Shaffer, 1981; Soule, 1987; Soule and Wilcox, 1980; Wegner and Merriam, 1979; Wilcove et al.,

List of Historic and Scientific Objects of Interest
GSENM 8-30-17

Object	Description	Location	Source
(b)(5) DPP	This is an exposed monocline. Consequently, many substrates (Summerville, Morrison, Dakota, Tropic, Entrada, Navajo, Wingate and Carmel) are exposed directly next to each other, providing an opportunity for studies of ecological processes independent of climate. This monocline also has an elevational gradient, facilitating the study of effects of temperature and moisture on community dynamics. In addition, the rocky substrate has provided refugia for many Arcto-Tertiary plants, providing a unique opportunity to examine the effects of ancient floral presence in the structuring of present-day plant communities. This area also supports a very high diversity of both general and endemic flora.	Straight Cliffs area	Hintze, 1988; Shulz, 1993; Albee et al., 1988; Axelrod, 1960; Welsh, 1978.
	Diversity of plant life ranging from low desert shrub to Ponderosa Pine (less that 1 mile apart) enhances the study and observation of ecology. 3 small stands of Ponderosa pine in Alvey Wash.	Death Ridge WSA	Utah BLM Statewide Final Wilderness EIS, 1990.
	Contained within the monument are 3-5 spatially separated areas where the same substrates are exposed in close proximity to each other. In addition, there are 5 elevational gradients along riparian corridors. This is critical for replicated scientific work to be conducted.	Entire monument	Hintze, 1988; USGS. Topographical Maps
	Riparian corridor with elevational gradient, connecting desert low lands to the high country. Vermillion, White, Pink Cliffs (Triassic, Jurassic, Cretaceous material).	Johnson's Creek	Hintze, 1988; USGS Topographical Maps; Beier, 1993; Noss, 1992, 1993.
	Fifty Mile Mountain. Presence of aspen on Pleasant Grove, Steer Canyon, and Pinto Mare Canyons.	Fifty Mile Mountain WSA	Utah BLM Statewide Final Wilderness EIS, 1990.
	Protects lands at low elevation sites frequently rich in species diversity. The range of elevation in these areas from approximately 4500-8300 feet encompasses a wide variation in elevation and will capture the full diversity of plant and animal species in the region.	Entire monument proposal including the Escalante area, Kaiparowits Plateau, and areas west to Kanab	Hintze, 1988; Utah BIM Final Wilderness EIS, 1990
	hanging gardens, tinajas, canyon bottom, dunal pockets, salt-pocket and rock crevice communities. These small, isolated populations often contain unusual, often relictual plants and animals. Hanging gardens and canyon bottom communities harbor riparian plants and their pollinators, as well as unique vertebrates (bats and small mammals) and soil fauna. Tinajas are important aquatic resources, and contain a diverse array of tadpole, fairy and clam shrimp, amphibians, algae, water beetles, other crustaceans, snails, mosquito and gnat larvae and aquatic/riparian plants. Highly saline areas are found around many seeps and streams, and consist of plants and animals adapted to highly saline conditions. Dunal pockets contain species adapted to shifting sands, while rock crevice communities consist mostly of slow-growing species that can thrive in extremely infertile sites. These communities offer a chance to examine gene flow dynamics, and to distinguish the respective role of pollen versus seeds. They offer an opportunity to study ground water flow dynamics in the absence of significant fluvial processes, and	Entire monument	Nabhen and Wilson, 1996; Harper et al., 1994; Welsh et al., 1993; May et al., 1995; Fowler et al., 1995; Graff, 1988.

List of Historic and Scientific Objects of Interest
GSENM 8-30-17

Object	Description	Location	Source
[redacted] (b)(5) DPP	These canyons provide a high concentration of isolated, unique plant and invertebrate communities: hanging garden, rock crevice, and canyon bottom communities. Many relictual plant species can be found in these communities. Pack rat middens are abundant, providing paleoclimate and paleo-vegetation information.	Escalante canyons	Axelrod, 1960; BLM Wilderness EIS; Van Devender and Spauling, 1979; Fowler et al., 1995; Nabhen and Wilson, 1996.
	Dunal pockets contribute Great Plains species to the flora. These are unique, isolated plant communities.	Cockscomb to Kaiparowits	Hintze, 1988.
	Unique, isolated communities are located throughout the monument. These include hanging gardens, tinajas, canyon bottom, dunal pocket, salt pocket and rock crevice communities. They provide great opportunities for examining evolution, gene flow, island biogeography and other ecological principles.	Entire monument	Case and Cody, 1988; Diamond, 1981; Dott, 1996; Harris, 1984; Ludwig and Whitford, 1981; Fowler et al., 1995; Nabhen and Wilson, 1996; Roberts, 1987; Reice, 1994; Axelrod, 1960.
	Biological conservation theory and literature suggests that large contiguous conservation areas increase both extent and probability of population survival, increases protection of migratory pathways, and is the most effective means of conserving aquatic and riparian communities.	Entire monument	al., 1996; Miller, 1961; Minckley and Deacon, 1968; Armbruster and Lande, 1993; Fahrig and Merriam, 1985; Beier, 1993; Belovsky, 1987; Brown, 1971; Davidson et al. 1996; Diamond, 1981; Frankel and Soule, 1981; Harris and Gallagher, 1989; Heaney, 1984; IUCN, 1978; Kushlan, 1979; Lomolino and Channell, 1995; Meffe and Carroll, 1994; Newmark, 1995; Noss, 1993; Patterson, 1984; Pickett and Thompson, 1978; Primack, 1993; Saunders et al., 1991; Shaffer, 1981; Soule, 1987; Soule and Wilcox, 1980; Wegner and Merriam, 1979; Wilcove et al., 1986; Willis, 1974.

Object	Description	Location	Source
			1993; Albee et al., 1988; Axelrod, 1960; Welsh, 1978; Stevens, 1992; Dott, 1996; Armbruster and Lande, 1993; Fahrig and Merriam, 1985; Beier, 1993; Belovsky, 1987; Brown, 1971; Davidson et al. 1996; Diamond, 1981; Frankel and Soule, 1981; Harris and Gallagher, 1989; Heaney, 1984; IUCN, 1978; Kushlan, 1979; Lomolino and Channell, 1995; Meffe and Carroll, 1994; Newmark, 1995; Noss, 1993; Patterson, 1984; Pickett and Thompson, 1978; Primack, 1993; Saunders et al., 1991; Shaffer, 1981; Soule, 1987; Soule and Wilcox, 1980; Wegner and Merriam, 1979; Wilcove et al.,
(b)(5) DPP	The connection with Glen Canyon provides a larger protected area. It also provides low desert vegetation as part of the vegetational gradients. Large areas are important for maintaining the evolutionary potential of plants and animals, allowing for the exchange of genetic material among the separate populations that constitute a population.	Common boundaries and riparian connections with Glen Canyon NRA, Capitol Reef NP, Box Hollow Wilderness and Paria Wilderness	
	Cryptobiotic soil crusts are critical for soil stability, nutrient availability for vascular plants and normal soil surface temperatures. These crusts are extremely fragile and easily disrupted by soil surface disturbances such as trampling or off-road vehicles. Since the soils in the monument are highly susceptible to erosion, it is important that these biocrusts be protected so they stabilize these erodible soil surfaces. In addition, these ecosystems have few nitrogen-fixing plants. Since these crusts provide nitrogen to these soils, they are a critical part of these nitrogen-limited ecosystems.	Entire monument	Belnap, 1994, 1995; Belnap and Harper, 1995; Belnap et al., 1994; Jefferies, 1989; Harper and Marble, 1988; Johansen, 1993; Mack and Thompson, 1978; Fleischner, 1994.
	Disturbance of most soil surfaces in the monument area will result in soil surface temperature changes as bio-crusted surfaces are darker than the substrates underneath them. The expected lowering of temperature with disturbance would result in cooler soil temperatures, and thus later spring plant germination and lower nutrient uptake rates. This may adversely effect desert plant growth in early spring. Surface temperatures also influence foraging and burrowing patterns for many soil invertebrates, and many effect community dynamics of these species.	Entire monument	Ludwig and Whitford 1981; Belnap 1995.

Object	Description	Location	Source
(b)(5) DPP	stable documented to date, as both large and small scale disturbances are limited spatially and temporally. Very little of this area was glaciated in the Pleistocene. Most plant communities evolved without fire or grazing by large ungulate herds, as evidenced by characteristics of the soils and the flora. Catastrophic events are minimal, with the exception of wash bottoms. Microsite disturbances are minimal as well, as most soils support very low populations of invertebrates. 1880 photos repeated in 1990 show many sites virtually unchanged, with the same tree, shrub and grass individuals present, indicating very low species' turnover rates in this region relative to other ecosystems. In addition, dead tree branches can still be found in virtually the same condition as they were 100 years ago, indicating plant tissue decomposition rates are extremely low in this region. This makes this area highly unique, as most ecosystems are believed to be structured disturbance. In this region, ecological processes can be studied independent of the effects of disturbance to give us greater insight into their functioning	Entire monument	Belnap, 1995, 1996; Belnap et al., 1994; Mack and Thompson, 1982; Fleischner, 1994; Kleiner and Harper 1972; Harper et al., 1994; Webb, 1994; Rogers, 1982; Pickett and White, 1985; Moldenke, 1995; Evans and Bhleringer, 1993; Turner et al. 1993; Iverson et al. 1981; Webb and Wilshire 1981; Larsen 1996; Bowers et al. 1994.
	Isolation of this area has resulted in minimal human impacts. Many of the ecosystems found in this area have received little, if any, human use and the type and extent of disturbance has that has occurred is known. In addition, there are large areas unbroken by roads. This is essential to the protection and conservation of plant and animal species.	Entire monument	Wilcox et al 1986; Wilcox and Murphy 1985; Mader et al., 1990; Osley, et al., 1974; Rost and Bailey, 1979; Witmer and Calesta, 1985
	The monument lacks any areas that have been invaded to any large extent by exotic species. There are few such areas in the Intermountain West, and they can provide invaluable information in understanding the ecology and dynamics of exotic plant invasion. These areas aid scientists in understanding what makes systems resistant to such invasions, and thus help land managers predict what areas are susceptible to invasion and restore already-invaded regions.	Entire monument	Billings, 1994; Fleischner, 1994; Forcella and Harvey, 1983; Gross, 1987; Hunter, 1990; Loope et al., 1988; MacMahon, 1987; Pellant and Hall, 1994
	Six threatened or endangered candidate species are located within or near this area.	Wahweap WSA	Utah BLM Statewide Final Wilderness EIS, 1990.
	Contains Peregrine falcon (endangered) and 6 special status animal species and 5 special status plant species.	Mud Spring WSA	Utah BLM Statewide Final Wilderness EIS, 1990.
	Habitat for Swainson's hawk, golden eagle (Sensitive) and peregrine falcon (endangered).	The Blues WSA	Utah BLM Statewide Final Wilderness EIS, 1990.
	Peregrine falcon and bald eagle (endangered). 8 animal and 5 plant species of special status.	Paria-Hackberry and Cockscomb WSA and Wahweap WSA	Utah BLM Statewide Final Wilderness EIS, 1990.
	Thirteen species of raptors are known or suspected of nesting in the WSA.	Burning Hills WSA	Utah BLM Statewide Final Wilderness EIS, 1990.
	Relict plant community in the upper part of Dry Valley "probably possesses important scientific values"	Mud Springs Canyon WSA	Utah BLM Statewide Final Wilderness EIS, 1990.

List of Historic and Scientific Objects of Interest
GSENM 8-30-17

Object	Description	Location	Source
[redacted] (b)(5) DPP	Unique relict plant community of pinion-juniper and sagebrush-grass park vegetation accessible only by a steep trail. One of the few remaining unaltered plant communities in Utah. No Man's Mesa RNA was designated as an ACEC in 1986. Such areas are invaluable to science. They provide restoration and management goals for administration of lands. Such areas are also critical to scientists who are trying to understand the natural functioning of ecosystems. Grasslands are especially valuable, as almost all have been heavily grazed for over a century.	Paria-Hackberry WSA (No Man's Mesa and Little No Man's Mesa)	Utah BLM Statewide Final Wilderness EIS, 1990 and Kleiner and Harper, 1972
	Four Mile Bench Old Tree Area. Unique area of extremely old (1,400 years) pinon and juniper trees. Unique scientific values on over 1,000 acres.	Wahweap WSA	Utah BLM Statewide Final Wilderness EIS, 1990.
	This region is at the northern end of areas that receive summer monsoonal rains, and is at the southern end of areas that depends on winter rains. This distinction is very important to the physiological functioning of plants in this moisture-limited areas, as even minor changes in temperature and/or rainfall may lead to major differences in water availability, and consequently, plant metabolic processes. Climate change is expected to alter both rainfall timing and amount, as well as temperature. This, in tum, would alter plant physiology, water use patterns and community composition in this region, making the monument an excellent place for studying global climate change.	Entire monument	Ayyad 1981; Graff 1988; Van Devender and Spaulding 1979; Wagner 1981.
	Unlike most deserts that are primarily depositional environments, the CP is an erosional one (Welsh 1979; Nat Hist). This contributes to high endemism, as substrate material is not mixed. In addition, it makes this region highly susceptible to soil loss when surfaces are disturbed. This soil loss has a negative impact on plant and aquatic communities, as well as dam sediment loads.	Entire monument	Welsh, 1979; Harper et al., 1994.
	The effects of scaling up and down are not known for many ecological processes. The multitude of variably sized, discrete watersheds found in this area offer a unique opportunity to test the effects of scaling for hydrological and biological processes. In addition, the close spacing of these watersheds offers a chance to separate the effects of area per se from other environmental factors on community structure.	Entire monument	Allen and Hoekstra 1987; Reice 1994; Pickett and White 1985; Rosenweig 1985.
	Semi-arid and arid lands of the western United States are highly susceptible to desertification. The lack of natural disturbance in much of this area offers the opportunity to study the effects of different types and levels of land use and to better understand the steps leading to desertification.	Entire monument	Dregne, 1983.

List of Historic and Scientific Objects of Interest
GSENM 8-30-17

Object	Description	Location	Source
(b)(5) DPP	This area contains few exotic plants. Having this resource gives the opportunity to better understand what factors inhibit or facilitate exotic plant invasions. Roads have been heavily implicated in facilitating exotic plant invasion, while intact Cryptobiotic soil crusts and less favorable soil chemistry may inhibit such an invasion. Invasion could fundamentally alter these communities, by altering species composition, community dynamics and fire cycles.	Entire monument	Monsen and Kitchen, 1994; Kelly 1996; Harper and Marble 1988; Davidson et al. 1996.
	Quaternary resources are abundant in the monument. Pack rat middens enable reconstruction of paleoclimates and paleo-vegetation, while Pleistocene animal remains found in alcoves.	Entire monument	Harper et al., 1994.
	Unlike more mesic ecosystems, there is little evidence that desert communities demonstrate traditional successional sequences. There is little or no modification of soils or other site characteristics by previous-occurring plants. Understanding of this is important for restoration efforts. The monument offers an excellent opportunity to study this phenomenon independent of climate and disturbance factors.	Entire monument	Barbour, 1981; MacMahon, 1987; Shreve, 1942; Dott, 1996.
	Peregrine falcon and Bald Eagle use these areas. Areas are habitat for 7 plant and 9 animal species considered sensitive.	Death Ridge and Fifty Mile Mountain WSAs	Utah Statewide Wilderness Study Report, 1991.
	Peregrine falcon and Bald Eagle use these areas. Areas are habitat for 8 plant and 7 animal species considered sensitive.	Phipps Death Hollow ISA and Steep Creek WSA	Utah Statewide Wilderness Study Report, 1991.
	Peregrine falcon and Bald Eagle use these areas. Areas are habitat for 9 plant and 7 animal species considered sensitive.	North Escalante Canyon, The Gulch and Carcass Canyon WSAs	Utah Statewide Wilderness Study Report, 1991.

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Publishing Company/Proceedings/Report Series & Year	Journal/Book/Proceeding Information	Title of Paper	Author	Notes	Publication Type	DOI Sec. Memo 1996
HRA, Inc. Conservation Archaeology	HRA Papers in Archaeology No. 1 June 2000	*Pithouse Excavations at the Park Wash Site (42KA4280) Grand Staircase-Escalante National Monument SouthCentral Utah Prepared for BLM Kanab Field Office*	Ahlstrom, Richard V. N., editor.	Archaeology	Journal Article	
		Anasazi Subsistence in the St. George Basin, Southwestern Utah	Allison, James R., Master of Arts Thesis, April 1990	Archaeology	Thesis and Dissertations	
		Exploring Navajo-Anaasazi Relationships Using Traditional (Oral) Histories	Begay, Robert M., Master of Arts Thesis, May 2003	Archaeology	Thesis and Dissertations	
		Residential Mobility of Paleoarchaic and Early Archaic Occupants at North Creek Shelter (42GA5863): An Analysis of Chipped Stone Artifacts	Bodily, Mark L., Master of Arts Thesis, April, 2009	Archaeology	Thesis and Dissertations	
Utah Museum of Natural History	1979	*Petroglyphs and Pictographs of Utah, 2 vols*	Castleton, Kenneth	Archaeology	Book/Chapter	Yes
Johnson Books	1990	*Legacy on Stone: Rock Art of the Colorado Plateau and Four Corners Region*	Cole, Sally J	Archaeology	Book/Chapter	Yes
P-III Associates, Inc.	in Tipps, Betsy L., editor, The Burr Trail Archeological Project: Small Site Archeology on the Escalante Plateau and	*Pottery*	Coulam, Nancy J.	Archaeology	Book/Chapter	
		Demographic, Climatic, and Settlement Pattern Change Amoug the Western Anasazi of Kane County, Utah	Dohr, Susan Lintz, Master of Arts Thesis, December 1994	Archaeology	Thesis and Dissertations	
Museum of Northern Arizona		*Archaeological and Ethnohistorical Phase I Consultation for the Kaiparowits Power Project: Proposed Plant Sites, Impact Study Area and Proposed Transmission Line Corridors*	Fish, Paul	Archaeology	Conference Proceedings/ Professional Papers	Yes
U. S. Department of the Interior	Navajo Nation Archaeology Department, Archaeology Report 98-112, Flagstaff, AZ 1990, GSENM Special	*Kaibabitsinungwu: An Archaeological Sample Survey of the Kaiparowits Plateau*	Geib, Phil R., Jim H. Collette, and Kimberly Spurr	Archaeology	Book/Chapter	
University of Utah Press	1979	*Archeological Survey of the Kaiparowits Plateau in The Glen Canyon Archeological Survey*	Gunnerson, James H	Archaeology	Book/Chapter	Yes

		Fremont Site distribution in the Upper Escalante River Drainage	Harris, Deborah C., Master of Arts Thesis, March 2009	Archaeology	Thesis and Dissertations	
US Department of Interior	U.S. Bureau of Land Management Utah Office Cultural Resource Series no. 4, final report for contract 14-08-0001-	*Cultural Resource Evaluation in South Central Utah, 1977-78*	Hauck, Forrest	Archaeology	Journal Article	Yes
The Center for Desert Archaeology	Archeology Southwest, V.15, No.1, Winter, 2001	*Grand Canyon-Parashant*	Hawks, Diana	Archaeology	Journal Article	
The Center for Desert Archaeology	Archeology Southwest, V.15, No.1, Winter, 2001	*Vermillion Cliffs*	Hawks, Diana	Archaeology	Journal Article	
University of Utah Press, Salt Lake City	in Rhode, David, editor, Meetings at the Margins: Prehistoric cultural Interactions in the Intermountain West,	*Fremont-Anasazi Boundary Maintenance and Permeability in the Escalante Drainage*	Janetski, Joel C., Lane D. Richens, and Richard K. Talbot	Archaeology	Book/Chapter	
Society for American Archaeology	American Antiquity, 77(1), p.125-159, 2012	*The Paleoarchaic to Early Archaic Transition on the Colorado Plateau: The Archaeology of North Creek Shelter*	Janetski, Joel C., Mark L. Bodily, Bradley A. Newbold, and David T. Yoder	Archaeology	Journal Article	
	Utah Historical Quarterly, 79(3): 204-223	*Deep Human History in Escalante Valley and Southern Utah*	Janetski, Joel C., Mark L. Bodily, Bradley A. Newbold, and David T. Yoder	Archaeology	Journal Article	
University of Utah Press	1981	*Prehistoric and Historic Settlement in the Escalante Desert*	Janetski, Joel, ed.	Archaeology	Book/Chapter	Yes
Project U00DN0030b, July, 2002		*Archaeological Survey of The Gulch, Burr Trail to the Escalante River, Garfield County, Utah*	Keller, Donald R.	Archaeology	Reports to GSENM	
		Paleoethnobotanical Analysis of three Early Pueblo II Period Virgin anasazi Sites in Southwestern Utah: 42Ws1191, 42Ws3119, And 42Ws4145	Landon, Amanda Jane, A Masters Research paper	Archaeology	Thesis and Dissertations	
Utah Geological Survey	Circular 95, 1997	*A Preliminary Assessment of Archeological Resources within the Grand Staircase-Escalante National Monument, Utah*	Madsen, David B.	Archaeology	Journal Article	

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		The Chemical Analysis of Archaeologically Associated Sediments: A Case from the American Sotthwest	Martin, Steve L., Masters Thesis, January 1993	Archaeology	Thesis and Dissertations	
1997		*Fremont Settlement in the Upper Escalante Drainage*	McFadden, Doug	Archaeology	Conference Proceedings/ Professional Papers	
2002		*Who's Who on the Monument? Virgin, Kayenta and Fremont Relationships*	McFadden, Doug	Archaeology	Conference Proceedings/ Professional Papers	
The Center for Desert Archaeology	Archeology Southwest, V.15, No.1, Winter, 2001	*Preserving Archaeology on an Unprecedented Scale Grand Staircase-Escalante*	McFadden, Doug	Archaeology	Journal Article	
GSENM		*The Middle Trail Inventory: Evidence for Pueblo IV Presence North of the Colorado River*	McFadden, Douglas A.	Archaeology	Journal Article	
The Colorado Archaeological Society	Southwestern Lore, Journal of Colorado Archaeology, v.77, n.2-3, Summer/Fall, 2011	*The Basketmaker II Horizon: A View from the Grand Staircase*	McFadden, Douglas A.	Archaeology	Journal Article	
U. S. Department of the Interior	Grand Staircase-Escalante National Monument, June 1, 2003	*Tank Hollow Burn Inventory: Settlement Patterns and Agricultural Strategies on Fiftymile Mountain*	McFadden, Douglas A.	Archaeology	Book/Chapter	
U. S. Department of the Interior	Grand Staircase-Escalante National Monument, Aug., 2000	*Formative Chronology and Site Distribution on the Grand Staircase-Escalante National Monument*	McFadden, Douglas A.	Archaeology	Book/Chapter	
U. S. Department of the Interior	Utah Cultural Resource Series No. 27, Grand Staircase-Escalante National Monument Special Publication No.3, 2012	*Excavations at the Arroyo Site, 42Ka3976, A Pueblo II/III Virgin Anasazi Farmstead*	McFadden, Douglas A.	Archaeology	Book/Chapter	
Utah Statewide Archaeological Society (USAS), Utah Professional Archaeological Council (UPAC) and Utah Division	in Jones, Kevin T., Robert B. Kohl, Editors, Utah Archaeology, 1996	*Virgin Anasazi Settlement and Adaptation on the Grand Staircase*	McFadden, Douglas A.	Archaeology	Book/Chapter	
Publisher's Press	1966	*Hole-in-the-Rock: An Epic in the Colonization of the Great American West*	Miller, David	Archaeology	Book/Chapter	Yes
Grand Canyon Trust	1994	*Preserving Traces of the Past - Protecting the Colorado Plateau's Archaeological Heritage*	Moore, Rick	Archaeology	Reports to GSENM	
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DOI: 2019-06 01909

Arizona Archaeological and Hisdtorical Society	KIVA: The Journal of Southwestern Anthropology and History, v.75, n.1, p.37-60, Fall, 2012	*Early Holocene Turkey (Melaegris Galloparo) Remains from Southern Utah, Implications for the origins of the Puebloan Domestic Turkeys*	Newbold, Bradley A., Joel C. Janetsky, Mark L. Bodily, and David T. Yoder	Archaeology	Journal Article	
		Paleoindian Lifeways of Paleoarchaic Peoples: A Faunal Analysis of Early Occupations at North Creek Shelter, Utah	Newbold, Bradley A., Master of Arts Thesis, August 2009	Archaeology	Thesis and Dissertations	
Meadow Lane Publications	1980	*Through the Hole in the Rock to San Juan*	Reay, Lee	Archaeology	Book/Chapter	Yes
		A Comparative Analysis of Human Skeletal Remains from Parowan Frefmont, Virgin Anasazi, and Kayenta Anasazi Archaeological	Roberts, Heidi, Master of Arts in Anthropology Thesis, December,	Archaeology	Thesis and Dissertations	
	Chapter 8 THE FORMATIVE	*The Florescence of Agricultual Dependence, Sedentism and Social Complexity in the Grand Staircase-Escalante National Monument Region A.D. 600 to 1300*	Spangler, J. CPAA-Colorado Plateau Archaeological Alliance	Archaeology	Book/Chapter	
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		A Spatial and Stylistic Analysis of Cup and Channel Petroglyphs from the Arizona Strip	Terlep, Michael L. Master of Arts Thesis, May 2012	Archaeology	Thesis and Dissertations	
U. S. Department of the Interior	BLM Cultural Resource Series, No.22, 1988	*The Tar Sands Project: An Inventory and Predictive Model for Central and Southern Utah*	Tipps, Betsy L.	Archaeology	Book/Chapter	
		Macrobotanical Analysis and Interpretation from 42KA1568: A Late Anasazi Pueblo in Southern Utah	Valdez, Adella J., Master of Arts Thesis, August 1993	Archaeology	Thesis and Dissertations	
U. S. Department of the Interior	Utah Cultural Resource Series No. 26. Grand Staircase-Escalante National Monument Special Publication No. 2	*Archeology of the Dead Raven Site Preface written by Gardiner Dalley of the BLM Cedar City Field Office and Douglas McFadden of GSENM*	Walling, Barbara A., Richard A. Thompson, with a contribution by Kathleen Heath	Archaeology	Journal Article	
May, 2001		*References on the American Indian Use of Fire in Ecosystems*	Williams, Gerald W.	Archaeology	Reports to GSENM	

Art City Publishers	1964	*The Escalante Story: A History of the Town of Escalante. and Description of the Surrounding Territory, Garfield County, Utah, 1875-1964*	Woolsey, Nethella	Archaeology	Book/Chapter	Yes
Arizona Archaeological and Hisdtorical Society	KIVA: The Journal of Southwestern Anthropology and History, v.75, n.4, p.425-446, Summer, 2010	*The Onset of Small Seed Processing on the Colorado Plateau*	Yoder, David T., Mark L. Bodily, Sara Hill, Joel C. Janetski, and Bradley A. Newbold	Archaeology	Journal Article	
		Storage and mobility among the Fremont: Changing forms through time	Yoder, David T., Master of Arts Thesis, Dec., 2006	Archaeology	Thesis and Dissertations	
Wasatch Publishers	1982	*Canyon country rock art*	Barnes, F. A.	Archeology	Book/Chapter	Yes
		Hopi Ethnographic Overview for Grand Staircase-Escalante National Monument	Bernardini	Archeology	Report to GSENM	
Utah Museum of Natural History, Salt Lake City	1979	*Petroglyphs and pictographs of Utah*	Castleton, K.	Archeology	Book/Chapter	Yes
Utah Professional Archeological Council	Journal of Utah Archaelogy, v.1988, p.5-28, 1988	*Fluted projectile points in Utah*	Copeland, J. M., and R. E. Fike	Archeology	Journal Article	
		A description of fifteen inhabitants within the endolithic environment of the Navajo Sandstone	Enloe, Crystal L., Masters Thesis, 2000	Archeology	Thesis and Dissertations	
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Museum of Northern Arizona		*Preliminary report for archaeological and ethnohistorical Phase 1 consultation for the Kaiparowits power project proposed*	Firmage, R. A.	Archeology	Reports to GSENM	
University of Utah	University of Utah Press Anthropological Papers, v.64, 1963	*1961 excavations, Harris Wash, Utah*	Fowler, D. D.	Archeology	Journal Article	
University of Utah	University of Utah Press Anthropological Papers, v.66, Glen Canyon Series no.20, 1963	*1961 excavations, Kaiparowits Plateau, Utah*	Fowler, D. D., and C. M. Aikens	Archeology	Journal Article	Yes

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1996		*Virgin Anasazi Settlement and Adaptation on the Grand Staircase*	McFadden, Doug	Archeology	Proceedings/ Professional Papers	
2000		*Formative Chronology and Site Distribution on Grand Staircase-Escalante National Monument*	McFadden, Doug	Archeology	Conference Proceedings/ Professional Papers	
2003		*Tank Hollow Burn Inventory: Settlement Patterns and Agricultural Strategies on Fiftymile Mountain*	McFadden, Doug	Archeology	Conference Proceedings/ Professional Papers	
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Utah Bureau of Land Management, Salt Lake City	in Excavations of two Anasazi sites in southern Utah, p.153-192, BLM Cultural Resource Series No. 9, 1981	*Archaeological Excavations at the Kanab Site, Kane County, Utah*	Nickens, P. R. and K. L. Kvamme	Archeology	Book/Chapter	
		Slab-lined pit features of Big Flat in Grand Staircase National Monument	Schaub, Megan, Master of Arts Thesis - August 2003	Archeology	Thesis and Dissertations	
	2001	*Ethnographic Assessment of Kaibab Paiute Resources in Grand Staircase-Escalante National Monument*	Stoffle, et al	Archeology	Journal Article	
		Keyenta Anasazi Settlement in the Circle Cliffs	Wright, Alyssa R., Master of Arts Thesis, Dec., 2001	Archeology	Thesis and Dissertations	
	2002	*Who Broke the Glass on the Staircase?: Obsidian on Grand Staircase Escalante National Monument*	Zweifel, Matt	Archeology	Conference Proceedings/ Professional Papers	
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		The mammals of the Grand Staircase-Escalante National Monument, Utah: Study 1: a biotic survey and habitat assessment of small mammals - Study 2: functional factors of habitat selection and the population dynamics of translocated desert bighorn sheep (ovis cnandensis nelsoni)	Alston, Jackee L., Masters Thesis, 2003	Ecology	Thesis and Dissertations	
USDA/USFS/BLM/NPS	1991	*Utah threatened, endangered and sensitive plant field guide*	Atwood, K, J Holland, R Bolander, B Franklin. DE House, L Armstrong , K Thome and L England	Ecology	Journal Article	Yes
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		Inhabitation of a wind-abraded environment by denitrifying prokaryotes and fungi	Battaglia, Louis, Master of Science, 2001	Ecology	Thesis and Dissertations	
Ecology and Management of Annual Rangelands, Ogden, UT, 1994	USDA-INT-GTR-313, Monsen, S. B. and S. G. Kitchen, eds., p.179-185	*Potential role of cyanobacterial-lichen soil crusts*	Belnap, J.	Ecology	Conference Proceedings/ Professional Papers	
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		Effects of Managed Grazing on Vegetation Structure and Range Condition in Grand Staircase-Escalante National Monument, UT: Combining Imaging Spectroscopy and Field Studies	Harris, Albert Thomas, III, Masters Thesis, 2002	Ecology	Thesis and Dissertations	
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		The vegetation, soil, and cruptogamic crusts of Blackbrush communities in the Kaiparowits Basin	Jeffries, D., Ph.D. Dissertation, 1989	Ecology	Thesis and Dissertations	
USDA	in M. K. Young, ed. Conservation assessment for inland cutthroat trout. Technical Report RM-GTR-256, USDA Forest Service, 1995) pp. 28-35	*Bonneville cutthroat trout*	Kershner, J. L.	Ecology	Journal Article	Yes
		Degradation of Human Feces and Fecal Bacterial Movement from Catholes in Southwest Canyon Country	Kimmel, Nadia V., Masters Thesis, 2000	Ecology	Thesis and Dissertations	
Horizon Press, UK	in McClean, J. C., and A. W. Decho, editors, Molecular Ecology of Biofilms, p.105-119., 2002	*Interactions of endolityic microbial communities with the physical environment*	Kurtz, Jr., H. D.	Ecology	Book/Chapter	
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Department of Systematic Biology, National Museum of Natural History, Smithsonian Institution, Washington, D.C., 2001		*Checklist of Shore Flies (Diptera: Ephydridae) From Grand Staircase-Escalante National Monument*	Mathis, W., and D. Mathis	Ecology	Reports to GSENM	
		Understanding the effects of invasive riparian vegetation on stream macroinvertebrate communities on the Colorado Plateau	Moline, Angela B., 2006	Ecology	Thesis and Dissertations	

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		The need for a multivariate approach to understand patterns of species richness and invasion: a case study in Grand Staircase-Escalante National Monument, Utah	Waters, M. Alycia, Master of Science Thesis, 2003	Ecology	Thesis and Dissertations	
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		Late Holocene Flooding on the Escalante River, South-Central Utah	Webb, Robert Howard, Ph.D. Dissertation, 1985, research hydrologist with USGS	Ecology	Thesis and Dissertations	
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Brigham Young University		*Insects and other arthropods of the Grand Staircase-Escalante National Monument*	Baumann, Richard W., and C. Riley Nelson, Dept. of Zoology, BYU	Ecology	Reports to GSENM	
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Allen Press Publishing Services	Rangeland Ecology and Management 62(6), Nov. 2009 p.491-499	*Managing Complex Problems in Rangeland Ecosystems*	Boyd, Chad S., and Tony J. Svejcar	Ecology	Journal Article	
University of Arizona Press, Tucson	and Mark K. Sagge, editors, The Colorado Plateau III, Integrating Research and Resources	*Vertebrate Species of the Colorado Plateau: Assessment From the Southwest Regional Gap Analysis Project*	Boykin, Kenneth G., Charles Drost, and J. Judson Wynne	Ecology	Book/Chapter	
		An examination of the DNA content, taxonomy and phylogeny of Penstemon (Plantaginaceae)	Broderick, Shaun R. Master of Science Thesis, April, 2010	Ecology	Thesis and Dissertations	
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		Paleoecology of Grand Staircase-Escalante National Monument: Human Landscape Impacts and Management Implications on the Colorado Plateau	D'Andrea, Robert M., Master of Science in Environmental Sciences and Policy Thesis, December 2015	Ecology	Thesis and Dissertations	
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Elsevier	Journal of Arid Environments,2009 V.73, p.937-948	*Using packrat middens to assess grazing effects on vegetation change (2009)*	Fisher, J., K. L. Cole, R. S. Anderson	Ecology	Journal Article	
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Annual Report, January, 2007		*Differentiating Paleoclimate and Paleoenvironments in the Morrison Formation Using Detailed Paleopedological Analyses*	Jennings, Debra	Ecology	Reports to GSENM	

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		Late Cretaceous Microherpetofaunas of the Kaiparowits Plateau, Utah	McCord, Robert Dudridge, Ph.D. Dissertation, 1997, (UMI#9814409)	Ecology	Thesis and Dissertations	
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November, 2001		*Flora of Bureau of Land Management Grand Staircase Escalante National Monument and Kane County, Utah*	Welsh, Stanley L., and Nephi Duane Atwood	Ecology	Reports to GSENM	
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Geological Society of America	Rocky Mountain - 54th Annual Meeting, Session No. 8, May 7-9, 2002	*Creation and Burial of a Major Mesozoic Landform: New Microfossil Evidence Bearing on the Age of the J-2 Unvonformity (Grand Staircase-Escalante National Monument, Utah)*	Ash, Sidney R., and Ronald J. Litwin	Geology	Conference Proceedings/ Professional Papers	

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Geological Society of America	Geological Society of America, Abstracts with Programs, v.7, p.716, 1975	*Conodont biostratigraphy of the Kaibab and lower Plymton Formations*	Baird, M. R., and J. W. Collionson	Geology	Conference Proceedings/ Professional Papers	
		Conodont biostratigraphy of the Kaibab Formation, eastern Nevada and west-central Utah	Baird, M. R., Master's Thesis, 1975	Geology	Thesis and Dissertations	
		Mechanism and sequence of formation of deformation bands into spatially localized or distributed sets: ladders, riedels, and echelon arrays of Utah	Balasko, Clara, Masters of Science Thesis, 2003	Geology	Thesis and Dissertations	
Wiley-Blackwell	Geofluids, 11, 124-133, 2011	*Precipitation patterns formed by self-organizing processes in porous media*	Barge, L. M., D. E. Hammond, M. A. Chan, S. Potter, J. Petruska, K. H. Nealson	Geology	Journal Article	
		Investigation of Permeability Patterns and Diagenetic Heterogeneity Along the J-2 Uncomformity (UT-CO-AZ)	Bechberger, Melody, Master of Arts thesis, 2011	Geology	Thesis and Dissertations	
The Americal Association of Petroleum Geologists	AAPG Bulletin, V.91, No. 2 (Feb.2007), p. 173-190	*Reflectance spectroscopic mapping of diagenetic heterogeneities and fluid-flow pathways in the Jurassic Navajo Sandstone*	Beitler Bowen, Brenda, Brigette A. Martini, Marjorie A. Chan, William T. Parry	Geology	Journal Article	
2005 Annual Report		*Sandstone bleaching and iron concretions in the Jurassic Navajo Sandstone, southern Utah*	Beitler, Brenda	Geology	Reports to GSENM	
Geological Society of America	Geology; Dec. 2003 V. 31, no. 12; P 1041-1044 1 table	*Bleaching of Jurassic Navajo Sandstone on Colorado Plateau Laramine highs: Evidence of exhumed hydrocarbon supergiants:*	Beitler, Brenda, Marjorie A. Chan, William T. Parry	Geology	Journal Article	
SEPM (Society for Sedimentary Geology)	Journal of Sedimentary Research, 2005, V. 75, 547-561 DOI: 10.2110/jsr.2005.045	*Fingerprints of Fluid Flow: Chemical Diagenetic History of the Jurassic Navajo Sandstone, Southern Utah, U.S.A.*	Beitler, Brenda, W.T.Parry and Marjorie A. Chan	Geology	Journal Article	
Geological Society of America	GSA Abstract with Programs, Annual Meeting, Poster, 2002	*Field Mapping and Multispectral Analysis of Jurassic Navajo Sandstone color and iron mineralization, Grand Staircase-Escalante National Monument, Utah*	Beitler, Brenda, Marjorie A. Chan, and William T. Parry	Geology	Conference Proceedings/ Professional Papers	
2009 Final Report		*Focus on understanding the depositional and diagenetic history of the Navajo Sandstone*	Beitler-Bowen, Brenda	Geology	Reports to GSENM	
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		Spatial Analysis of Channel-Belt Stacking Patterns: Metrics to Discriminate Between Local and Regional controls on Deposition in the Fluvial John Henry Member of the Straight cliffs Formation, Southern Utah	Benhallam, Wassim, Master of Science in Geology Thesis, April, 2015	Geology	Thesis and Dissertations	
Oxford University Press		*Grand Canyon Geology*	Beus, Stanley and Morales, Michael, eds	Geology	Book/Chapter	Yes
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Intermountain Association of Petroleum Geologists, 1963	12th Annual Field Conference, Guidebook to the Geology of Southwestern Utah, Vol.37, p.42-58	*Pennsylvanian and Permian Systems of southwestern Utah*	Bissell, H. J.	Geology	Conference Proceedings/ Professional Papers	
SEPM (Society for Sedimentary Geology)	in Longman, M. W., and M. D. Sonnenfield, editors, Paleozoic systems of the Rocky Mountain region, USA, 1996	*Permian eolian deposits, sequences, and sequence boundaries, Colorado Plateau*	Blakey, R. C.	Geology	Book/Chapter	
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		Geology of the Paria Northwest quadrangle, Kane County, Utah	Blakey, R. C., Masters Thesis, 1970	Geology	Thesis and Dissertations	
		The Calico Bed, Upper Cretaceous, Southern Utah: A Fluvial Sheet Deposit in the Western Interior Foreland Basin and its Relationship to Eustasy and Tectonics	Bobb, Margaret Cook, Master of Science Thesis, July, 1991, High School teacher in Denver	Geology	Thesis and Dissertations	
		Sandstone Bleaching and Iron Concretions: An Index to Fluid Pathways and Diagenetic History of the Jurassic Navajo Sandstone, Southern Utah	Bowen, Brenda Beitler, Ph.D Dissertation, 2005	Geology	Thesis and Dissertations	
Geological Society of America	Rocky Mountain - 54th Annual Meeting, Session No. 2, May 7-9, 2002	*Eggshell from the Upper Campanian Kaiparowits Formation*	Bray, Emily S.	Geology	Conference Proceedings/ Professional Papers	
Geological Society of America	GSA Annual Meeting, Session No. 31, Paper No. 31-0, November 5-8, 2001	*Stratigraphic and Paleo-environmental Study and Interpretation of the Chinle Formation, Wolverine Petrified Wood Area, Grand Staircase-Escalante National Monument, Utah*	Brown, Christina M.	Geology	Conference Proceedings/ Professional Papers	
		Sedimentology and sequence stratigraphy of the Chinle Formation, Southern Utah	Brown, Christina M., Master of Science Thesis, May 2003	Geology	Thesis and Dissertations	

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Elsevier	Icarus International Journal of Solar System Studies, V.194; N.1; p.65-71 March 2008	*Polygonal cracks in bedrock on Earth and Mars: Implications for weathering*	Chan, Marjorie A., W. Adolph Yonkee, Dennis I. Netoff, Winston M. Seiler, Richard L. Ford	Geology	Journal Article	
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SEPM (Society for Sedimentary Geology)	Sedimentary Geology of Mars, SEPM Special Publication No. 102, 2012	*Characteristics of Terrestrial Ferric Oxide Concretions and Implications for Mars*	Chan, Marjorie A., Sally L. Potter, B. Bowen, W. T. Parry, Laura M. Barge, Winston Seiler, Erich U. Petersen, John R. Bowman	Geology	Journal Article	
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		Sequence stratigraphy, sedimentology and provenance of the Drip Tank Member, Straight Cliffs Formation, Kaiparowits Plateau, Southwestern Utah	Christensen, Amy E., Master of Science Thesis, May, 2005	Geology	Thesis and Dissertations	
	in Carpenter,K., et.al., editors, The Upper Jurassic Morrison Formation -- an interdisciplinary study, Modern Geology 23, p.507-537, 1998	*Appendix - The fauna and flora of the Morrison Formation*	Chure, D. J., K. Carpenter, R. Litwin, S. Hasiotis, and E. Evanoff	Geology	Book/Chapter	
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GSENM Number: UT-05-032-14-G, January, 2009		*U-Pb ages of detrital zircons in relation to paleogeography: Triassic paleodrainage networks and sediment dispersal across southwest Laurentia*	Dickinson, William R., and George E. Gehrels	Geology	Reports to GSENM	
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Museum of Northern Arizona	in Morales, M., editor, Aspects of Mesozoic geology and paleontology of the Colorado Plateau, v.59, p.129-152, 1993	*Cretaceous paleogeography of the Colorado Plateau and adjacent areas*	Elder, W. P. and J. I. Kirkland	Geology	Book/Chapter	
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USGS	in Kirschbaum, M. A., L. N. R. Roberts, and L. H. R. Biewick, editors, Geologic Assessment of Coal in the Colorado Plateau: Arizona, Colorado, New Mexico, and Utah; Chapter T	*Geologic Overview and Resource Assessment of Coal in the Kaiparowits Plateau, Southern Utah*	Hettinger, Robert D., Laura N. R. Roberts, Laura R. H. Biewick, and Mark A. Kirschbaum	Geology	Book/Chapter	
Utah Geological and Mineralogical Survey, University of Utah, 1966, 1958		*Paleozoic Stratigraphy and Oil Possibilities ofKaiparowits Region, Utah*	Heylmun, Edgar	Geology	Book/Chapter	Yes
Blackwell Publishing	Basin Research, 2009, doi: 10.1111/j.1365.2117.2009.00398.x	*Insights into syndepositional fault movement in a foreland basin; trends in seismites of the Upper Cretaceous, Wahweap Formation, Kaiparowits Basin, Utah, USA*	Hilbert-Wolf, Hannah L., Edward L. Simpson, Wendy S. Simpson, Sarah E. Tindall and Michael C. Wizevich	Geology	Journal Article	
Brigham Young University	1988	*Geologic History of Utah*	Hintze, Lehi	Geology	Journal Article	Yes
Elsevier	Developments in Sedimentology Series Vol 38 (1983) p 429-454	*Interpreting cyclic crossbedding, with an example from the Navajo sandstone*	Hunter, Ralph E., and David M. Rubin	Geology	Journal Article	

		The magneto-stratigraphy and paleopoles of the Moenave and Kayenta Formations, Kanab, Utah	Hutny, Magdalena, Master of Science, Aug. 2003	Geology	Thesis and Dissertations	
USGS http://pubs.usgs.gov www.usgs.gov	U. S. Geological Survey Professional Paper 483-C, 1964	*Marine Jurassic pelecypods from central and southern Utah*	Imlay, Ralph W.	Geology	Journal Article	
Ann Arbor Science Publishers	Palo Alto Electric Power Research Institute, editor, 1981	*The Kaiparowits coal project and the environment: a case study*	Jepperson, R.	Geology	Book/Chapter	
Ann Arbor: Ann Arbor Science Publishers; and Palo Alto: Electric Power Research Institute, 1981		*The Kaiparowits Coal Project and the Environment: A Case Study*	Jepperson, Ronald, et al.	Geology	Book/Chapter	Yes
SEPM (Society for Sedimentary Geology)	Journal of Sedimentary Research, 2011, v.81, 266-283	*Facies associations, paleoenvironment, and base-level changes in the Upper Cretaceous Wahweap Formation, Utah, U.S.A.*	Jinnah, Zubair A., and Eric M. Roberts	Geology	Journal Article	
Elsevier	Cretaceous Research 2009 30(2):287-299	*New 40Ar/39Ar and detrital zircon U-Pb ages for the Upper Cretaceous Wahweap and Kaiparowits formations on the Kaiparowits Plateau, Utah: implications for regional correlation, provenance, and biostratigraphy*	Jinnah, Zubair A., Eric M. Roberts, Alan L. Deino, Joseph S. Larson, Paul K. Link, C Mark Fanning	Geology	Journal Article	
2009 Annual Report UT-06-033-01-G		*Straight Cliffs Formation Correlation Project*	Johnson, Cari	Geology	Reports to GSENM	
		Braided stream deposition and provenance of the Late Cretaceous-Paleocene(?) Canaan Peak Formation, Table Cliff and Kaiparowits Plateaus, Southwestern Utah	Jones, David Allen , Master of Science Thesis, 1989	Geology	Thesis and Dissertations	
Mary Ann Liebert, Inc.	Astrobiology v-15, n.8, p.616-636	*Life and Liesegang: Outcrop-Scale Microbially Induced Diagenetic Structures and Geochemical Self-Organization Phenomena Produced by Oxidation of Reduced Iron*	Kettler, Richard M., David B. Loope, Karrie A. Weber, and Paul B. Niles	Geology	Journal Article	
Utah Geological Society	Utah Geological Society Guidebook to Geology of Utah 19, p. 93-111 (1995)	*History of exploration for oil and natural in the Kaiparowits region, Utah, in Geology and resources of south-central Utah: Resources for power*	Kutkel, R. P	Geology	Journal Article	Yes
		Facies and Provenance of the Pine Hollow Formation: Implications for Seveir foreland basin evolution and the Paleocene climate of Southern Utah	Larsen, Joseph Scott, Master of Science, 2007	Geology	Thesis and Dissertations	
Utah Geological Association	in Carney, Stephanie M., David E. Tabet, and Cari L. Johnson, editors, Geology of South Central Utah, Utah Geological Association Publication 39, 2010	*Cyclic Stratigraphy of the Paleogene Pine Hollow Formation and detrital zircon provenance of Campanian to Eocene Sandstones of the Kaiparowits and Table Cliffs Basins, South-Central Utah*	Larson, Joseph S., Paul K. Link, Eric M. Roberts, Leif Tapanila and C. Mark Fanning	Geology	Book/Chapter	

		Effects of Relative Sea Level Fluctuations and Other Controls in Linked Nearshore and Hemipelagic Depositional Settings; examples from the Bohemian Cretaceous Basin, Czech Republic, and the U. S. Western Interior	Laurin, Jiri, Ph. D. Thesis, August 2003	Geology	Thesis and Dissertations	
Society of Economic Geologists	Economic Geology, vol. VIII	*The Gold of the Shinarump at Paria*	Lawson, Andrew C.	Geology	Journal Article	
SEPM (Society for Sedimentary Geology)	Journal of Sedimentary Research 73(3):389-406, 2003	*Integrating sandstone petrology and nonmarine sequence stratigraphy: Application to the Late Cretaceous fluvial systems of southwestern Utah, U.S.A.*	Lawton, T. J., S. L. Pollock, R. A. J. Robinson	Geology	Journal Article	
USGS	U.S. Geological Survey Miscellaneous Investigations Series Map 1-1033-J, scale l: 125,000 (1983)	*Geologic cross sections of the Kaiparowits coal-basin area, Utah*	Lidke, K.J. and Sargent, K.A	Geology	Journal Article	Yes
		The influence of tectonics and eustasy on alluvial architecture, Middle Coniacian through Campanian Strata of the Kaiparowits Basin, Utah	Little, William Woodruff, Ph.D Thesis, 1995, Prof. at BYU Rexberg	Geology	Thesis and Dissertations	
Brigham Young University	Geology Studies, 6:61-180, 1969	*Palynology of the Kaiparowits Formation, Garfield County, Utah*	Lohrengel, C. Frederick, III	Geology	Journal Article	
Nature Publishing Group	Nature, vol. 412, p. 64-66 2001	*Annual monsoon rains recorded by Jurassic dunes*	Loope, D. B., C. M. Rowe, R. M. Joeckel	Geology	Journal Article	
Blackwell Publishing	Sedimentology, V. 51, p. 315-322, 2004 (homepage: http://www.wiley.com/bw/journal.asp?ref=0037-0746&site=1)	*Tropical Westerlies over Pangean sand seas*	Loope, D. B., M. B. Steiner, C. M. Rowe, N. Lancaster	Geology	Journal Article	
2010 Annual Report		*2010 Research in Grand Staircase-Escalante National Monument*	Loope, David	Geology	Reports to GSENM	
SEPM (Society for Sedimentary Geology)	Palaios, 2008, v. 23, P.411-419 Research Note DOI: 10.2110/palo.2006.p06-133r	*Life Beneath the Surfaces of Active Jurassic Dunes: Burrows from the Entrada Sandstone of South-Central Utah*	Loope, David B.	Geology	Journal Article	
SEPM (Society for Sedimentary Geology)	Palaios, Editor Jill Hardesty, palaios.ku.edu	*Dry-Season Tracks in Dinosaur-Triggered Grainflows*	Loope, David B.	Geology	Journal Article	
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The University of Chicago Press	The Journal of Geology, 2008, vol.116, p 173-183	*Wind Scour of Navajo Sandstone at the Wave (Central Colorado Plateau, U.S.A.)*	Loope, David B., Winston M. Seiler, Joseph A. Mason and Marjorie A. Chan	Geology	Journal Article	
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Geological Society of America	Geology v.38, n.11, p.999-1002, Nov. 2010 doi:10.1130/G31213.1	*Follow the water: connecting a CO2 reservoir and bleached sandstone to iron-rich concretions in the Navajo Sandstone of south-central Utah, USA*	Loope, David B., Richard M. Kettler, and Karrie A. Weber	Geology	Journal Article	
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Utah Geological Association	in MacLean, J. S., R. F. Biek, and J. E. Huntoon, editors, Geology of Utah's far south, Utah Geological Association Publication 43, p.11-24, 2014	*Prelude to Seven Slots: Filling and Subsequent Modification of Seven Broad Canyons in the Navajo Sandstone, South-Central Utah*	Loope, David B., Ronald J. Goble, and Joel P. L. Johnson	Geology	Book/Chapter	
	Canyon Legacy (Journal of the Dan O'Laurie Museum, Moab, Utah) v.54, p.8-12, Summer 2005	*Seasonal patterns of wind and rain recorded by the Navajo Sandstone*	Loope, David, B., and Clinton M. Rowe	Geology	Journal Article	
Geological Society of America	Geosphere C Revolution 2: Origin and Evolution of the Colorado River System II, themed issue	*Gravel-capped benches above northern tributaries of the Escalante River, south-central Utah*	Marchetti, David W., Scott A. Hynek, and Thure E. Cerling	Geology	Journal Article	
		Quaternary Geology of the Fremont River Drainage Basin, Utah	Marchetti, David Wm., PhD Dissertation, 2006, Prof. of Geology at State U. NY, Genesco	Geology	Thesis and Dissertations	
		Geology of the Escalante - Boulder area, Garfield County, Utah	McFall, C. C., Ph.D. Dissertation, 1955	Geology	Thesis and Dissertations	
Acta Palaeontologica Polonica Ecitor	Acta Palaeontol. Pol. 53 (2): 197-205, 2008 http://app.p53-197.pdfan.pl/acta53/app	*Crouching theropod and Navahopus sauropodomorph tracks from the Early Jurassic navajo Sandstone of USA*	Milan, Jesper, David B. Loope, and Richard G. Bromley	Geology	Journal Article	
The University of Chicago Press	The Journal of Geology, 2007, Vol. 115, p. 375-386	*Preservation and Erosion of Theropod Tracks in Eolian Deposits: Examples from the Middle Jurassic Entrada Sandstone, Utah, U.S.A.*	Milan, Jesper, and David B. Loope	Geology	Journal Article	
Elsevier	Paleo v.297, Issues 3-4, Nov. 20, 2010	*Attributes of the wood-boring trace fossil Asthenopodichnium in the Late Cretaceous Wahweap Formation, Utah, USA*	Moran, K., H. L. Hilbert-Wolf, K. Golder, H. F. Malenda, C. J. Smith, L. P. Storm, E. L. Simpson, M. C. Wizevich, S. E. Tindall	Geology	Journal Article	
Elsevier	Journal of Arid Environments (2001) 48:89-100	*Stabilization of friable sandstone surfaces in a desiccating, wind-abraded environment of south-central Utah by rock surface microorganisms*	Netoff, D. I., and H. D. Kurtz, Jr.	Geology	Journal Article	

USGS	USGS Open File report-93-390, 45p., 1993	*Morphology and possible origin of giant weathering pits in the Entrada Sandstone, southeastern Utah: preliminary findings*	Netoff, D. I., and R. R. Shroba	Geology	Journal Article	
Wiley Blackwell	Sedimentology, 2002, 49, 65-80	*Seismogenically induced fluidization of Jurassic erg sands, south-central Utah*	Netoff, Dennis	Geology	Journal Article	
John Wiley and Sons	Earth Surface Processes and Landforms, 2008, 33, 000-000 DOI: 10.1002/esp.1697	*Aeolian activity at a giant sandstone weathering pit in arid south-central Utah*	Netoff, Dennis I., and Marjorie A. Chan	Geology	Journal Article	
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Geological Society of London	Journal of the Geological Society, London, v.162, 2005, P.939-949 www.geolsoc.org.us/jgs	*Evolution of damage zone geometry and intensity in porous sandstone: insight gained from strain energy density*	Okubo, Chris H., and Richard A. Schultz	Geology	Journal Article	
		Strain localization within fault-related folds, with applications to Mars	Okubo, Chris H., PhD Thesis, 2005	Geology	Thesis and Dissertations	
The Americal Association of Petroleum Geologists	American Association of Petroleum Geologists Bulletin 53, p.734-735, 1969	*Significance of palynomorphs as sedimentation indicators in Cretaceous Straight Cliffs Sandstone, Utah*	Orlansky, R.	Geology	Journal Article	
Utah Department of Natural Resources	Utah Geological and Mineral Survey, Bulletin 89, 1971	*Palynology of the Upper Cretaceous Straight Cliffs Sandstone, Garfield County, Utah*	Orlansky, R.	Geology	Journal Article	
Elsevier	Icarus, V.171 (2004) 295-316	*Geological features indicative of processes related to the hematite formation in Meridiani Planum and Aram Chaos, Mars: a comparison with diagenetic hematite deposits in southern Utah, USA*	Ormo, Jens, Goro Komatsu, Marjorie A. Chan, Brenda Beitler, William T. Parry	Geology	Journal Article	
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American Association of Petroleum Geologists	Environmental Geosciences, V.14, n.2, P.91-109, June 2007 DOI: 10.1306/eg.07120606004	*Geochemistry of CO2 sequestration in the Jurassic Navajo Sandstone, Colorado Plateau, Utah*	Parry, W. T., Craig B. Forster, J. P. Evan, Brenda Beitler Bowen, and Marjorie Cahn	Geology	Journal Article	
The Americal Association of Petroleum Geologists	AAPG Bulletin, V.88, No.2 (Feb.2004), P 175-191, 2004	*Chemical bleaching indicates episodes of fluid flow in deformation bands in sandstone*	Parry, W. T., Marjorie A. Chan, and Brenda Beitler	Geology	Journal Article	
The Americal Association of Petroleum Geologists	American Association of Petroleum Geologists Bulletin 59:00:00, p.919-920, 1975	*Influence of tectonism on deposition of coal in Straight Cliffs Formation (Upper Cretaceous), south-central Utah*	Peterson, F.	Geology	Journal Article	

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USGS	U.S. Geological Survey Bulletin 1274-J: 1-28, 1969	*Four new members of the Upper Cretaceous Straight Cliffs Formation in southeastern Kaiparowits region, Kane County, Utah*	Peterson, Fred	Geology	Journal Article	Yes
USGS	U.S.Geological Survey Open-File Report, p.259, 1969	*Cretaceous sedimentation and tectonism in the southeastern Kaiparowits region*	Peterson, Fred	Geology	Journal Article	
USGS	U.S.Geological Survey Professional Paper 1035-A, p.29, 1978	*Principle unconformities in Triassic and Jurassic rocks, Western Interior U.S.-a preliminary report*	Pipiringos, G. N., and R. G. O'Sullivan	Geology	Journal Article	
www.brycecanyon.org	Bryce Canyon Natural History Association, Research Report, v.97-1, p.75, 1997	*Paleontologic inventory of dominantly marine and brackish-water Late Cretaceous rocks in the Grand Staircase-Escalante National Monument*	Pollock, G. L., W. A. Cobban, and T. S. Dyman	Geology	Journal Article	
The Americal Association of Petroleum Geologists	Grants-in-aid Recipient for 1998: AAPG Bulletin 82, No.11, p.2166	*Provenance, Geometry, depositional facies, and age of the Upper Cretaceous Wahweap Formation, Cordilleran foreland basin, southern Utah*	Pollock, S. L.	Geology	Journal Article	
		Provenance, geometry, lithofacies, and age of the Upper Cretaceous Wahweap Formation, Cordilleran Foreland Basin, Southern Utah	Pollock, Stonnie L., Master of Science Thesis, July, 1999	Geology	Thesis and Dissertations	
Wiley Blackwell	Geofluids, 2011	*Joint controlled fluid flow patterns and iron mass transfer in Jurassic Navajo Sandstone, Southern Utah, USA*	Potter, S. L., and M. A. Chan	Geology	Journal Article	
Elsevier	Earth and Planetary Science Letters, 301, 444-456, 2011	*Characterization of Navajo Sandstone Concretions: Mars comparison and criteria for distinguishing diagenetic origins*	Potter, Sally L., Marjorie A. Chan, Erich U. Petersen, M. Darby Dyar, Elizabeth Sklute	Geology	Journal Article	
		Characterization of Navajo Sandstone Hydrous Ferric Oxide Concretions	Potter, Sally Latham, Master of Science in Geology Thesis, December 2009	Geology	Thesis and Dissertations	
		Stratigraphic Evolution of an Estuarine Fill Succession, and Reservoir Characterization of Inclined Heterolithic Strata, Cretaceous of Southern Utah, USA	Purcell, Ryan Michael, Master of Science in Geology Thesis, July, 2015	Geology	Thesis and Dissertations	
Geological Society of America	Geology, v.31, p.761-764, 2003	*Combined single grain (U-Th)/He and U/Pb dating of detrital zircons from the Navajo Sandstone, Utah*	Rahl, J. M., P. W. Reiners, I. H. Campbell, S. Nicolescu, and C. M. Allen	Geology	Journal Article	
Elsevier	Sedimentary Geology, 197:207-233, 2007	*Facies architecture and depositional environments of the Upper Cretaceous Kaiparowits Formation, southern Utah*	Roberts, E. M.	Geology	Journal Article	
Elsevier	Cretaceous Research 26:307-318, 2005	*40Ar/39Ar age of the Kaiparowits Formation, southern Utah, and correlation of contemporaneous Campanian strata and vertebrate faunas along the margin of the Western Interior Basin*	Roberts, E. M., A. L. Deino and M. A. Chan	Geology	Journal Article	

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		Stratigraphic, Taphonomic, and Paleoenvironmental Analysis of the Upper Cretaceous Kaiparowits Formation, Grand Staircase-Escalante National Monument, Southern Utah	Roberts, Eric C., PhD Dissertation, 2005	Geology	Thesis and Dissertations	
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The Paleontological Society www.paleosoc.org	Journal of Paleontology 81(1), 2007, p.201-208	*Continental insect borings in dinosaur bone: Examples from the Late Cretaceous of Madagascar and Utah*	Roberts, Eric M., Raymond D. Rogers, Brady Z. Foreman	Geology	Journal Article	
Utah Geological Association	in Carney, Stephanie M., David E. Tabet, and Cari L. Johnson, editors, Geology of South Central Utah, Utah Geological Association Publication 39, 2010	*Variations in iron oxide, iron sulfide, and carbonate concretions and their distributions in fluvio-deltaic and nearshore sandstones: Cretaceous examples from the Kaiparowits Plateau, Utah, and San Juan Basin, New Mexico*	Roberts, Eric M., and Marjorie A. Chan	Geology	Book/Chapter	
Geological Society of America	GSA Abstracts with Programs, 2005 Annual Meeting, Rocky Mountain Section, 37:115, 2005	*Taphonomy of an unusual freshwater shell bed in the Upper Cretaceous Kaiparowits Formation, southern Utah*	Roberts, Eric M., Leif Tapanila, and Brandon Mijal	Geology	Conference Proceedings/ Professional Papers	
USGS	U. S. Geological Survey Professional Paper 1561, 1995	*Paleogeography of the Late Cretaceous of the western interior of middle North America--coal distribution and sediment accumulation*	Roberts, Laura N. Robinson, and Mark A. Kirschbaum	Geology	Journal Article	
Department of Geosciences, University of Nebraska, Lincoln, NE	Science, Vol. 318 32 November 2007	*Inconsistencies Between Pangean Reconstructions and Basic Climate Controls*	Rowe, Clinton M., David B. Loope, Rob*ert J. Oglesby, Rob Van der Voo, Charles E. Broadwater*	Geology	Journal Article	
Elsevier	Developments in Sedimentology Series Vol 38 (1983) p 407-427	*Reconstructing bedform assemblages from compound crossbedding*	Rubin, D.M., and Ralph E. Hunter	Geology	Journal Article	
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USGS	U. S. Geological Survey Bulletin 1601, 1984	*Environmental geologic studies of the Kaiparowits Coal-Basin area, Utah*	Sargent, K. A.	Geology	Journal Article	
USGS http://pubs.usgs.gov www.usgs.gov	U.s. Geological Survey Miscellaneous Investigations Series MAP-I-1033-I, 1982	*Bedrock geologic map of the Kaiparowits coal-basin area, Utah*	Sargent, K. A., and D. E. Hansen	Geology	Journal Article	

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USGS	U. S. Geological Survey Open-File Report 76-811, 1976	*General geology and mineral resources of the coal area of south-central Utah*	Sargent, K. A., and D. E. Hansen	Geology	Journal Article	Yes
USGS	U.S. Geological Survey Bulletin 1601, 1984	*Environmental Geologic Studies of the Kaiparowits Coal-Basin Area, Utah*	Sargent, K.A	Geology	Journal Article	Yes
USGS	U.S. Geological Survey Miscellaneous Investigations Series Map 1-1033-G. scale 1:125,000 (1980)	*Landform map of the Kaiparowits coal-basin area, Utah*	Sargent, K.A., and Hansen. D.E	Geology	Journal Article	Yes
Elsevier	Tectonophysics 411 (2005), 1-18, 2005	*A general framework for the occurrence and faulting of deformation bands in porous granular rocks*	Schultz, R. A., and R. Siddharthan	Geology	Journal Article	
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Geological Society of America	Geology, vol. 19. no. 7 (July I, 1991) pp.-742-74	*Predicting Facics Architecture Through Sequence Stratigraphy--An Example from the Kaiparowits Plateau, Utah*	Shanley, Keith	Geology	Journal Article	Yes
	in Titus, A., editor, Paleontology and Geology of the Cretaceous Interior Seaway, Jan. 2010	*Implications of the Internal Plumbing of a Late Cretaceous Sand Blow: Grand Staircase-Escalante National Monument, Utah*	Simpson, E. L., H. L. Hilbert-Wolf, M. C. Wizevich, S. E. Tindall	Geology	Book/Chapter	
Geological Society of America	Geology, November 2009, v.37, n.11, p.967-970 doi:10.1130/G30022A.1	*An Upper Cretaceous sag pond deposit: Implications for recognition of local seismicity and surface rupture along the Kaibab monocline, Utah*	Simpson, E. L., M. C. Wizevich, H. L. Hilbert-Wolf, S. E. Tindall, J. J. Bernard, and W. S. Simpson	Geology	Journal Article	
Elsevier	Palaeo 270, 2008 p.19-28	*The interaction of aeolian and fluvial processes during deposition of the Upper Cretaceous capping sandstone member, Wahweap Formation, Kaiparowits Basin, Utah, U.S.A.*	Simpson, Edward L., H. L. Hilbert-Wolf, W. S. Simpson, S. E. Tindall, T.A. Bernard, J.J. Jenesky, M. C. Wizevich	Geology	Journal Article	
Geological Society of America	Geology v.38, n.08, p.699-702, doi:10.1130/G31019.1; 3 figures YEAR???	*Predatory digging behavior by dinosaurs*	Simpson, Edward L., Hannah L. Hilbert-Wolf, Michael C. Wizevich, Sarah E. Tindall, Ben R. Fasinski, Lauren P. Storm, Mattathias D. Needle	Geology	Journal Article	

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Elsevier	Sedimentary Geology 230, 139-145, 2010	*A preserved Late Cretaceous biological soil crust in the capping sandstone member, Wahweap Formation, Grand Staircase-Escalante National Monument, Utah: Paleoclimatic implications*	Simpson, W. S., E. L. Simpson, M. C. Wizevich, H. F. Malenda, H. L. Hilbert-Wolf, S. E.Tindall	Geology	Journal Article	
Astrobiology at NASA	Astrobiology v.6, n.4, 2006, p.527-545	*Ultrastructural Study of Iron Oxide Precipitates: Implications for the Search for Biosignatures in the Meridiani Hematite Concretions, Mars*	Souza-Egipsy, Virginia, Jens Orno, Brenda Beitler Bowen, Marjorie A. Chan, and Goro Komatsu	Geology	Journal Article	
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		Paleomagnetic, structural, and seismological evidence for oblique-slip deformation in fault-related folds in the Rocky Mountain Foreland, Colorado Plateau, and central Coast Ranges	Tetreault, Joya Liana, Masters Thesis, 2006	Geology	Thesis and Dissertations	
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Geological Society of America	Lithosphere v.2, n.4, p.221-231, 2010	*Growth faults in the Kaiparowits Basin, Utah, pinpoint initial Laramide deformation in the western Colorado Plateau*	Tindall, S. E., L. P. Storm, T. A. Jenesky, E. L. Simpson	Geology	Journal Article	
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Utah Geological Association	in Sprinkel, D.A., T. C. Chidsey, and P. B. Anderson, editors, Millenium Guidebook, Publication 28, 2000, p.629-643	*The Cockscomb Segment of the East Kaibab Monocline: Taking the Structural Plunge*	Tindall, Sarah E.	Geology	Book/Chapter	
Elsevier	Journal of Structural Geology, 21, 1999, 1303-1320	*Monocline development by oblique-slip fault-propagation folding: the East Kaibab monocline, Colorado Plateau, Utah*	Tindall, Sarah E., and G. H. Davis	Geology	Journal Article	

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Final Report, 1999		*The Morrison Formation Extinct Ecosystems Project*	Turner, Christine E., and Fred Peterson	Geology	Reports to GSENM	
Utah Geological Survey	Circular 93, UGS Survey Notes, v.29, n.3, p.1-3, May, 1997	*Energy and Mineral Resources within the Grand Staircase-Escalante National Monument*	UGS Staff	Geology	Journal Article	
Utah Geological Survey	Public Information Series 49, 1997	*Geologic Topographic map of the Grand Staircase-Escalante National Monument, Utah*	UGS Staff	Geology	Journal Article	
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Wiley Blackwell	Sedimentology, V46, P807-836 1999 International Association of Sedimentologists	*Sequence stratigraphy of the Dakota Formation (Cenomanian) southern Utah: interplay of eustasy and tectonics in a foreland basin*	Ulicny, David	Geology	Journal Article	
Geological Society of America	GSA Bulletin, V.78, p.353-368, 1967	*Formation of red beds in modern and ancient deserts*	Walker, T. R.	Geology	Journal Article	
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		Geology of the Plateau and Rim - part of the 1882 field season of Charles Doolittle Walcott, USGS geologist/paleontologist	Yochelson, Ellis L.	Geology	Reports to GSENM	
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		Natural Gamma-Ray Spectrometry, Lithofacies, and Depositional Environments of Selected Upper Cretaceous Marine Mudrocks, Western United States, Including Tropic Shale and tununk Member of Mancos Shale	Zelt, Frederick Bruce, Doctor of Philosophy Dissertation, June, 1985	Geology	Thesis and Dissertations	
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		Public Land and American Demographic Imaginaries: A Case Study of Conflict over the Management of Grand Staricase-Escalante National Monument	Brugger, Julie V., PhD. Dissertation, 2009	Human History	Thesis and Dissertations	
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		It's not just about the monument: Framing analysis reveals the multiple issues in the Grand Staircase-Escalante National Monument conflict	Campbell, Jane Burleson, Master of Science, Thesis, May 2004	Human History	Thesis and Dissertations	
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		Protected Landscapes and Multiple Use: BLM'S National Monuments and Conservation System	Nero, Heath Alan, Master of Science Thesis, April, 2009	Human History	Thesis and Dissertations	
Arizona State University, School of Community Resources and Development	Technical Report, 2013	*Linking Communities and Public Lands through Tourism: A Pilot Project*	Nyaupane, Gyan P., Dallen J. Timothy	Human History	Book/Chapter	
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		Exploring Knowledge, Attitudes and Reported Behavior of Southern Utah Back-Country Recreationists	Ruehrwein, R. Joseph, Master of Science Thesis, 1998	Human History	Thesis and Dissertations	
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		Elementary Environmental Education Curricula for the Grand Staircase-Esclalante National Monument	Sowards, Rachel H., Master of Recreation Resource Management Report, 2006	Human History	Thesis and Dissertations	
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		Conflicting Values, Contested Terrain: Mormon, Paiute and Wilderness Advocate Values of the Grand Staircase-Escalante National Monument	Trainor, Sarah Fleisher, PH.D. Dissertation, Fall, 2002	Human History	Thesis and Dissertations	
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	Sonoran Institute www.sonoraninstitute.org	*Preserving Canyon Country Case Study: Grand Staircase-Escalante National Monument*		Human History	Journal Article	
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Utah Geological Association	in Sprinkel, Douglas A., Thomas C. Chidsey, and Paul B. Anderson, editors, Geology of Utah's Parks and Monuments, Utah Geological Association Publication, p.579-589, 2000	*Inventory of dominantly marine and brackish-water fossils from Late Cretaceous rocks in and near Grand Staircase-Escalante National Monument, Utah*	Gobban, William A., Thaddeus S. Dyman, Gayle L. Pollock, Kenneth I. Takahashi, Larry E. Davis, and Dennis B. Riggin	Paleontology	Book/Chapter	
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The Society of Vertebrate Paleontology 2007	Journal of Vertebrate Paleontology 27(1):41-58, March 2007	*Plesiosaurs From the Upper Cretaceous (Cenomanian-Turonian) Tropic Shale of Southern Utah, Part 2: Polycotylidae*	Albright III, L. Barry, David D. Gillette, and Alan L. Titus	Paleontology	Journal Article	
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The Society of Verbebrate Paleontology www.vertpaleo.org	Journal of Vertebrate Paleontology	*Taphonomy of chasmosaurine certopsian skeleton from the Campanian Kaiparowits Formation, Grand Staircase-Escalante National Monument, Utah*	Getty, Michael	Paleontology	Conference Proceedings/ Professional Papers	
Indiana University Press	In Ryan, M. J., B.J. Dhinnery-Allgeier, and D.A. Eberth, editors, New Perspectives on Horned Dinosaurs 2010	*Taphonomy of Horned Dinosaurs (Ornithischia-Ceratopsidae) from the Late Campanian, Kaiparowits Formation, Grand Staircase-Escalante National Monument, Utah*	Getty, Michael A., Mark A. Loewen, Eric Roberts, Alan A. Titus, Scott D. Sampson	Paleontology	Book/Chapter	
Utah Museum of Natural History		*Collection of Vetebrate Fossils and Associated Taphonomic Data from the Late Cretaceous Kaiparowits and Wahweap Formations, Grand Staircase-Escalante National Monument, Utah*	Getty, Mike A., Eric K. Lund, Mark A. Loewen, Eric M. Roberts, and Alan L. Titus	Paleontology	Reports to GSENM	
Geological Society of America	Rocky Mountain 54th Annual Meeting, Session No. 8, May 7-9, 2002	*Logistical Issues Surrounding Paleontological Fieldwork in Grand Staircase-Escalante National Monument, Southern Utah*	Getty, Mike A., Scott D. Sampson, Mark A. Loewen, and Terry A. Gates	Paleontology	Conference Proceedings/ Professional Papers	
Museum of Northern Arizona	Plateau, The Land and People of the Colorado Plateau, Therizinosaur, v.4, n.2, Fall, 2007	*The Mystery of the Sickle-Claw Dinosaur*	Gillette, David D.	Paleontology	Journal Article	
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Indiana University Press	In Ryan, M. J., B.J. Dhinnery-Allgeier, and D.A. Eberth, editors, New Perspectives on Horned Dinosaurs 2010	*New centrosaurine ceratopsians from the Wahweap Formation, Grand Staircase-Escalante National Monument, southern Utah*	Kirkland, J. I., D. D. DeBlieux	Paleontology	Book/Chapter	
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The Society of Verbebrate Paleontology www.vertpaleo.org	Journal of Vertebrate Paleontology, 25(4):897-904, 2005	*A new oviraptorosaur (Theropoda: Maniraptora) from the Late Campanian of Utah and the status of the North American Oviraptorosauria*	Zanno, L. E., and S. D. Sampson	Paleontology	Journal Article	
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THE SECRETARY OF THE INTERIOR

WASHINGTON

NOV 6 1996

Memorandum

To: Director, Bureau of Land Management

From: Secretary

Subject: Management of the Grand Staircase - Escalante National Monument

On September 18, 1996, the President created by Proclamation the Grand Staircase - Escalante National Monument in Utah. This is the first National Monument in history for which management responsibility has been given to the Bureau of Land Management (BLM), offering BLM a highly visible opportunity to demonstrate its stewardship. The purposes of this memorandum are: (a) to direct that you issue interim guidance for managing the Monument during the next three years; and (b) to direct you to prepare the management plan for the Monument for my adoption by the end of that period.

The President's Proclamation directs management of the Monument pursuant to applicable legal authorities, including the Federal Land Policy and Management Act (FLPMA) and the National Environmental Policy Act (NEPA). Further, I want to make certain that we work very closely with the State of Utah as our efforts proceed. While stewardship of the Grand Staircase - Escalante National Monument is the responsibility of this Department, I believe an effective working relationship with the State is crucial to our development of an effective management plan. The State possesses expertise in numerous management disciplines, and its capabilities will complement our own.

INTERIM MANAGEMENT DIRECTION

The public should have more explicit information concerning the management of specific activities during the three year interim period. Accordingly, I ask that you issue appropriate guidance to field managers as soon as possible. Field managers should be fully conversant with that guidance and initiate efforts to provide information to the public as necessary.

The President's Proclamation cited the Monument's unique geological, paleontological, archeological, biological and historical values. It also stated that valid existing rights (VER) must be recognized, withdrew Federal lands and interests in lands within the Monument from entry, location, selection, sale, leasing, or other disposition (except exchange) under the public land laws including, among others, the mineral leasing and mining laws, and stated that existing grazing uses shall continue to be governed by applicable laws and regulations other than the Proclamation. As a general principle,

actions that are not precluded by the Proclamation and which do not conflict with the established purposes of the Monument may continue.

DEVELOPING THE MONUMENT MANAGEMENT PLAN

The President's Proclamation directed me to prepare, within three years, a management plan for the Monument and any necessary regulations. You should take the lead in preparing the plan and proposing it for my adoption. In preparing the plan, you must make certain that it reflects the purposes for which the Monument was established.

In order to assure an effective planning effort, you should develop a detailed inventory of significant resources within the Monument's boundaries which have been identified thus far through available sources. The inventory should have a usable format and be easy to update as new information becomes available. Attached is a bibliography of monument resources that was completed in connection with the Proclamation. Although there is considerable understanding of the Monument's attributes, much more work is needed to identify, assess, interpret and protect them in an integrated manner.

In addition to the State, local and Tribal governments, the private sector, the public and other Federal agencies have interests and insights as to managing the Monument's resources and integrating the Monument with local community development. I expect you to be energetic and innovative in working with these entities. Many models for involving our neighbors have been developed and implemented. Useful lessons can be drawn from these models throughout the West by both government and non-government entities.

The management of the Grand Staircase - Escalante National Monument is one of the Department's most visible and important priorities. Your work will have a profound impact on the public's assessment of the Bureau and of Federal land management in general. I know that the challenges of managing the Monument and preparing its management plan are significant and encompass a very broad variety of scientific, historical, and economic considerations. The Bureau will have my full support and encouragement as your efforts proceed.

Attachment

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Grand Staircase - Escalante National Monument
List of Historic and Scientific Objects of Interest

Objects of Geologic Interest

Description: Perennial streams enter entrenched canyons in white Navajo and deep-red Windgate Sandstone. Deer Creek, Steep Creek, and The Gulch have perennial flows of clear cold water. The Gulch leads up into the spectacular Circle Cliffs where remarkable specimens of petrified wood (60 ft. logs) exist in the Morrison and Chinle formations.

Location: Escalante - Steep Creek WSA

Source: Utah BLM Statewide Final Wilderness EIS, 1990

Description: White Canyon cuts through the Kaibab Limestone to the Coconino Sandstone, the oldest stratum in the Upper Escalante drainage.

Location: Escalante - Studhorse Peaks unit

Source: Davidson, E.S., Geology of the Circle Cliffs Area, Garfield and Kane Counties, Utah, 1967. p. 10

Description: Big Spencer Flat Road and the V Road is site of "thunderball" iron concretions known as Moqui marbles. These oddities weather out of the Navaho sandstone and are a popular recreation feature.

Location: North Escalante Canyons WSA

Source: Sargent, K.A., Environmental Geologic Studies of the Kaiparowits Coal-Basin, Utah. p. 16, and Utah BLM Statewide Final Wilderness EIS, 1990

Description: The Waterpocket Fold tops out at Deer Point (7,243 feet). Most of the Waterpocket Fold is in the Capitol Reef National Park where it is a major landmark.

Location: Escalante - Colt Mesa unit

Source: Utah Wilderness Coalition. Wilderness at the Edge. p. 189, and Davidson, E.S., Geology of the Circle Cliffs Area, Garfield and Kane Counties, Utah, 1967. p. 61

Description: The inner gorges of the upper Moody Canyons cut into the relatively harder Kaibab Limestone and Coconino Sandstone (oldest exposed layer in this region).

Location: Escalante - Colt Mesa unit

Source: Utah Wilderness Coalition. Wilderness at the Edge. p. 189

Description: Dry Valley Creek Canyon. A waterfall blocks the entrance to Dry Valley Creek Canyon and consequently, the canyon remains in its natural condition. A perennial stream cuts through alluvial benches. It is relict and probably possesses important scientific values.

Location: Mud Springs Canyon WSA

Source: Utah BLM Statewide Final Wilderness EIS, 1990

Description: The East Kaibab Monocline or the Cockscomb is unique as a Colorado

Plateau structure. Its alignment with the Paunsaugant, Seevier, and Hurricane faults suggest that it too could be a fault at depth. It extends from the Colorado River north to Canaan Peak and is a major landmark.

Location: Kaiparowits Plateau - The Cockscomb WSA

Source: Utah BLM Statewide Final Wilderness EIS, 1990

Description: The Blues - a Cretaceous shale badlands, richly colored and contrasting with adjacent pink sandstone cliffs that forms a significant part of the vista for visitors to Bryce Canyon National Park. The Kaiparowits formation is well exposed here represents an accumulation of exceedingly rapid proportions and an immature sedimentary region which is not well displayed in any other formation in the Colorado Plateau.

Location: The Blues WSA (near Bryce Canyon)

Source: Welch, S.L., Rigby, J.K., Hamblin, W.K., A Survey of Natural Landmark *Areas of the North Portion of the Colorado Plateau*, 1980. p. 248

Description: Fiftymile Mountain is a complex of deep canyons, upwarps, monoclines, hogbacks and a spectacular 42-mile long Straight Cliffs wall, topping a thousand-foot-high cliffline of the Summerville, Morrison and Dakota formations. This complex marks the edge of the Kaiparowits Plateau.

Location: Kaiparowits Plateau - Fiftymile Mountain WSA

Source: Utah BLM Statewide Final Wilderness EIS, 1990

Description: Ancient coal fires of Right Hand Collet Canyon have left surface remains in the form of clinkers and deep red ash. These remains dominate the visual character of the drainage.

Location: Carcass Canyon WSA

Source: Utah BLM Statewide Final Wilderness EIS, 1990

Description: Arch. Span of 40 feet located in Calf Canyon, and is visible from the Alvey Wash road.

Location: Carcass Canyon WSA

Source: Utah BLM Statewide Final Wilderness EIS, 1990

Description: Burning Hills - naturally occurring underground coal fires have turned steep and rugged exposed hilltops a distinctive red.

Location: Burning Hills WSA

Source: Utah BLM Statewide Final Wilderness EIS, 1990

Description: Devils Garden - oddly shaped arches (including Metate Arch) and rock formations in the hills at the foot of the cliffs marking the Kaiparowits Plateau.

Location: Carcass Canyon WSA (east of WSA)

Source: Utah BLM Statewide Final Wilderness EIS, 1990

Description: This area possesses exceptional scenic values and contains a

portion of the Cockscomb, a prominent southern Utah geologic feature. the Cockscomb forms 2 parallel knife-edged ridges with a bisection V-shaped trough. Flatirons, small monoliths, and other colorful formations are present on the west ridge. These major features of south central Utah cover over 4,000 acres.

Location: Mud Spring WSA.

Source: Utah BLM Statewide Final Wilderness EIS, 1990

Description: An interesting fold in Henrieville Creek along the northwest boundary of the WSA is of geologic interest and a sightseeing attraction.

Location: Mud Spring WSA

Source: Utah BLM Statewide Final Wilderness EIS, 1990

Description: Window Wind Arch above the middle trail has scenic value because of its location on the very edge of the Straight Cliffs. The Straight Cliffs escarpment is major landmark in south-central Utah and an important scenic feature within view from the Hole-in-the-Rock road. Woolsey Arch is located in Rock Creek Basin, an area of colorful Navaho sandstone and high cliffs.

Location: Fifty Mile Mountain WSA

Source: Utah BLM Statewide Final Wilderness EIS, 1990

Description: Unique because it consists of 2 prominent southern Utah physiographic systems. It includes the eastern most extension of the White Cliffs component of the famous ascending staircase, cliff and terrace physiography, the Vermillion, White, and Pink Cliffs; and east of the Paria river, the dividing point is the landscape representative of the Glen Canyon physiography of sculptured, dissected, and exposed Navaho sandstone. The area where these merge between Deer Range and Rock Springs Bench is a highly scenic complex and colorful landscape.

Location: Paria-Hackberry WSA

Source: Utah BLM Statewide Final Wilderness EIS, 1990

Description: The Vermillion Cliffs with its associated Wingate Sandstone cliffs, colorful Chinle badlands, and canyons with there multiple colors and the intensity of coloration contribute to high scenic quality. Included in this landscape are Hackberry Canyon, Paria River Valley, Hogeye Canyon, the Pilot Ridge-Starlight Canyon-Kirbys Point area and Eight Mile Pass.

Location: Paria-Hackberry WSA.

Source: Utah BLM Statewide Final Wilderness EIS, 1990

Description: An area of high scenic value include the breaks of the Rush Beds and the west wall of Cottonwood Canyon, upper tributaries to Hackberry Canyon, Death Valley Draw, and the exceptional Navajo Sandstone domes and fin formations on either side of lower Hackberry Canyon.

Location: Paria-Hackberry WSA

Source: Utah BLM Statewide Final Wilderness EIS, 1990

Description: Four ONA's designated to preserve "unique scenic values and natural wonders". North Escalante Canyon (5,800 acres), The Gulch (3,430), Escalante Canyons (480 acres), Phipps-Death Hollow (12 more outside WSA)

Location: North Escalante Canyons WSA

Source: Utah BLM Statewide Final Wilderness EIS, 1990

Location: North Escalante Canyons/The Gulch ISA

Description: This area is geologically complex and has some of the most outstanding canyon scenery in the country. Harris Wash a canyon of the classic Escalante River drainage canyon form with many entrenched meanders in the Navajo Sandstone.

Source: Utah BLM Statewide Final Wilderness EIS, 1990

Description: A unique feature of the Burning Hills is the red coloration in the landsgical is the result of geological changes attributed to the naturally occurring coal fires. The coloration creates a highly scenic area.

Location: Burning Hills WSA

Source: Utah BLM Statewide Final Wilderness EIS, 1990

Description: The White Cliffs are high white or yellow cliffs of Navajo Sandstone. Vary in height from 600' at Deer Springs Point bench to 1,200' at Deer Springs Point and the Sheep Creek Bull Valley Gorge-Paria River confluence. The cliffs consistently reach a 1000' in height and the cliffline is interrupted by 8 canyons.

Location: Paria-Hackberry WSA

Source: Utah BLM Statewide Final Wilderness EIS, 1990

Description: This area contains twenty-four undeveloped springs. Ten are located in upper Paria, 6 in hackberry, 5 on theeastern border of Cottonwood Creek, and 3 on west boundary. There are also 6 developed springs. These are significant features in this arid environment.

Location: Paria-Hackberry WSA

Source: Utah BLM Statewide Final Wilderness EIS, 1990

Description: Phipps-Death Hollow ONA (12/23/70) contains 34,288 acres managed to preserve scenic values and natural wonders.

Location: Phipps-Death Hollow ISA

Source: Utah BLM Statewide Final Wilderness EIS, 1990

Description: Arches. Peek-a-boo Rock, Wahweap Window, Jacob Hamblin Arch, Starlight Arch, Cobra Arch, Sam Pollack Arch, Woolsey Arch, and several more unnamed arches and natural bridges.

Location: Kaiparowits Plateau and adjacent areas

Source: Sargent, K.A., Environmental Geologic Studies of the Kaiparowits Coal-Basin, Utah.

Description: Sand-calcite crystals from the Morrison Formation. These crystals are the first reported occurrence from rocks of Jurassic age and only reported sand crystals in southern Utah.

Location: Kaiparowits Plateau

Source: Sargent, K.A., Environmental Geologic Studies of the Kaiparowits Coal-Basin, Utah. p. 18

Description: Circle Cliffs in the northeast portion of WSA features intensively colored red, orange, and purple Chinle mounds and ledges at the base of Wingate Sandstone cliffs. Vertically jointed cliffs banded with red, yellow, and white colors and bench tops and upper cliff faces possess innumerable orange-red Kayenta Sandstone knobs. One of most spectacular and distinctive landscapes on the Colorado Plateau.

Location: Steep Creek WSA

Source: Utah BLM Statewide Final Wilderness EIS, 1990

Description: Area includes Escalante Natural Bridge (130' high, 100 ' span) and 4 other natural bridges and arches.

Location: Phipps-Death Hollow WSA

Source: Utah BLM Statewide Final Wilderness EIS, 1990

Description: The Gulch is a major geologic feature. Deeply entrenched very sheer red straight line Wingate Sandstone walls. High ridges and slickrock peaks. Ridges drop fairly abruptly to canyons below.

Location: Steep Creek WSA

Source: Utah BLM Statewide Final Wilderness EIS, 1990

Description: Lamanite Natural Bridge. Actually a large arch with good symmetry and form. Located in an impressive setting in a deep side canyon to The Gulch.

Location: Steep Creek WSA

Source: Utah BLM Statewide Final Wilderness EIS, 1990

Description: Petrified wood. Upper Gulch-Circle Cliffs contains large, unbroken logs of petrified wood (NEA 2,213 acres). Maximum log length 36'. The scenic values of these logs is enhanced by their colorful surroundings.

Location: Steep Creek WSA

Source: Utah Statewide Wilderness EIS, 1990 W FEIS 3B 19, and Sargent, K.A., Environmental Geologic Studies of the Kaiparowits Coal-Basin, Utah. p.13.

Description: Outstanding scenic values include the upper portion of Paradise Canyon where sandstone in the Wahweap Formation outcrops as colorful walls and cliffs. Ponderosa pine growing in the sandstone enhance the scenic values. Two sandstone monoliths or fins above Alvey Wash are prominent geological features.

Location: Death Ridge WSA

Source: Utah BLM Statewide Final Wilderness EIS, 1990

Description: The area contains a unique canyon and bench system. The entire ISA contains outstanding scenery. Examples include the area east of Horse Canyon. Four canyons have isolated 10 benches of varying size . Many bench tops have

intricate pattern of innumerable e orange-red Kayenta Sandstone knobs. Wolverine Canyon and Death Hollow have extremely narrow and convoluted sections. Another feature, Harris Wash a canyon of the classic Escalante River drainage canyon form with many entrenched meanders in the Navajo Sandstone.

Location: North Escalante Canyons/The Gulch ISA

Source: Utah BLM Statewide Final Wilderness EIS, 1990

Description: Mollie's Nipple, an erosional remnant is a major landmark in the area.

Location: Kaiparowits Plateau.

Source: Utah BLM Statewide Final Wilderness EIS, 1990

Description: Natural Arches. Sam Pollock Arch, located at the head of a tributary drainage of Hackberry Canyon, and Starlight Arch located west of No Man's Mesa.

Location: Paria-Hackberry WSA

Source: Utah BLM Statewide Final Wilderness EIS, 1990

Description: Area of diverse geology represented by spectacular deep canyons. The Escalante River canyon is 1100 feet deep. The canyon walls are rough and broken and the canyon is narrow and it meanders. Pure white to golden sandstone has been eroded into expanses of slickrock. Death Hollow Canyon is 1,000' feet deep and meandering. The extensive upper basin through which Mamie Creek flows is a extremely dissected area of canyons, tanks, other formations. Red layers of Carmel Formation cap high mesas and ledges of the exposed Kayenta Formation.

Location: Phipps-Death Hollow ISA

Source: Utah BLM Statewide Final Wilderness EIS, 1990

Description: Petrified wood deposits just west of the Old Paria Townsite and in Hackberry Canyon. Both are in the Chinle formation.

Location: Paria-Hackberry WSA

Source: Utah BLM Statewide Final Wilderness EIS, 1990

Description: All the topographic features of the Kaiparowits region have been developed in sedimentary rocks. The Kaiparowits Plateau is a slightly tilted sedimentary mass that extends as a narrow mesa from the High Plateaus to Glen Canyon 70 miles distant. Its culminating point, Canaan Peak is an outlier of the Table Cliff Plateau; the Paria Plateau is a huge blick of sandstone, the Waterpocket monicline is a ridge of folded rock intricately dissected and flanked by hogbacks, and the broken "comb" in the vicinity of Paria is the edge of sandstone beds uptoruned in the East Kaibab fold. The Circle Cliffs are inward-facing walls of sandstone that rim an oval depression. These prominent features are but large-scale examples of the mesas, buttes, and ridges that characterize the landscape of southern Utah.

Location: Kaparowits Plateau region

Source: Gregory, H.E. and Moore, R. C. The Kaiparowits Region: A Geographic and Geologic Reconnaissance of Parst of Utah and Arizona. 1931.

Description: Paria River from Colorado River to its source, identified by NPS as

possessing values that may be of national significance, potential to be included in the National Wild and Scenic River System.

Location: Paria-hackberry WSA

Source: Utah BLM Statewide Final Wilderness EIS, 1990

Description: Escalante River from Lake Powell to its source , a section of 14.9 miles, was designated as for study as a candidate Wild and Scenic River by the Secretary of the Interior on 10/11/70.

Location: Phipps-Death Hollow ISA

Source: Utah BLM Statewide Final Wilderness EIS, 1990

Description: Lower Calf Creek Falls. Calf Creek Canyon is characterized by red alcoved walls, 2 waterfalls, and extensive expanses of white slickrock. Lower Calf Creek Falls drops 126' and Upper Calf Creek's drop is 86'. High educational values associated with interpretation of these areas.

Location: Phipps-Death Hollow ISA

Source: Utah BLM Statewide Final Wilderness EIS, 1990

Description: The area contains 40 miles of perennial streams, a significant feature in this arid environment.

Location: Phipps-Death Hollow ISA

Source: Utah BLM Statewide Final Wilderness EIS, 1990

Objects of Paleontologic Interest, August, 1996

Description: Fossil assemblage photographs. Typical mollusks from Tropic Shale, south of Escalante include straight cone edphalopods, ammonites, gastropods, and pelecypods and Cretaceous sharks teeth from the Straight Cliffs Formation.

Location: Kaiparowits Plateau

Source: Sargent,. K.A., Environmental Geologic Studies of the Kaiparowits Coal-Basin, Utah. pp 14-15

Description: Gray Cliffs/Pink Cliffs - This sequence of rocks may contain one of the best and most continuous records of Late Cretaceous terrestrial life in the world. Formation has yielded early mammals, lizards, dinosaurs, crocodillians, turtles, mollusks.

Location: Kaiparowits - The Blues WSA

Source: BLM, Escalante/Kanab RMP - Grand Staircase Ecosystem Analysis, 1994

Description: Fossils deemed by the Museum of Northern Arizona in a 1976 study to be of major importance. They are found in the Cretaceous Wahweap Formation outcrops include abundant fragments of turtle shells and dinosaurs, as well as several crocodile teeth. There is an excellent chance that mammal fossils will be found

Location: Kaiparowits Plateau - Nipple Bench unit

Source: BLM, Kaiparowits power project environmental impact statement, 1976

Description: The Straight Cliffs Formation is limited to the southern Utah area. It contains primitive mammals including one of the potentially oldest marsupial fossils identified.

Location: Kaiparowits Plateau

Source: BLM, Warm Springs Project Preliminary Draft EIS, 1996

Description: Invertebrate and vertebrate specimens found Straight Cliffs, Tropic Shale, and Dakota Formations. 13 collection sites recorded (gastropods, cephalopods in upper Cretaceous Formations, vertebrate in Dakota and Tropic Shales). Likely to occur along entire length of the Straight Cliffs

Location: Carcass Canyon WSA

Source: Utah BLM Statewide Final Wilderness EIS, 1990

Description: The Kaiparowits is of interest in understanding the evolution of mammals and other terrestrial vertebrates. Very little is known of Cretaceous mammals prior to the latest part of that period. The mid-Cretaceous mammalian twilight zone is spanned by the fossiliferous, terrestrial rock units of the Kaiparowits region. They contain unique evidence bearing on the early diversification of important mammalian groups of the Late Cretaceous. The thickness, continuity, and broad temporal distribution of the Kaiparowits sequence provides the opportunity to document changes in terrestrial vertebrate assemblages over a wide span of Late Cretaceous time.

Location: Kaiparowits Plateau

Source: Eaton, Jeffrey G, and Cifelli, Richard L. Preliminary report on Late Cretaceous mammals of the Kaiparowits Plateau, southern Utah, 1988

Description: Extremely significant fossils including marine and brackish water mollusks, turtles, crocodillians, lizards, dinosaurs, fishes, and mammals have been recovered from the Dakota formation, Tropic shale, Straight Cliffs Formation (Tibbet Canyon, Smoky Hollow, and John Henry members), and Wahweap formation in the area around the proposed Andelex mine and some localities lie directly along the proposed haul routes. This sequence of rocks(including the overlying Wahweap and Kaiparowits formations) contain perhaps the best and most continuous record of Late Cretaceous terrestrial life in the world

Location: Kaiparowits Plateau

Source: Eaton, Jeffrey G., Personal correspondence to Mr. Mike Noel, BLM, 1991

Objects of Prehistoric Interest

Description: Sixty sites have been recorded and the potential for additional sites is exceptionally high. Sites discovered to date include lithic scatters, 13 rockshelters (some w/storage cists and rock art), 1 pithouse village site and 1 structure (probably of Anasazi origin). Some of the rock art and rock shelter and 1 campsite are potentially eligible for nomination to the NRHP.

Location: North Escalante Canyons/The Gulch ISA

Source: Utah BLM Statewide Final Wilderness EIS, 1990

Description: Friendship Cove Pictograph site nominated to NRHP. This site consists of a set of large Fremont style pictographs painted on the face of a large sandstone cliff.

Location: Phipps-Death Hollow ISA, eastern part

Source: Utah BLM Statewide Final Wilderness EIS, 1990

Description: Forty-four sites of diverse types have been recorded in the area. 14 rock art (petroglyph and pictographs sites (2 from Fremont culture), 1 Pit-house village site, lithic scatters of Paiute and Anasazi , and 6 rockshelters have been discovered. Potential for more sites is good.

Location: Phipps-Death Hollow ISA

Source: Utah BLM Statewide Final Wilderness EIS, 1990

Description: Situated at the intersection of three major prehistoric cultures the Plateau has long been a magnet for archeological study. It has been recognized that the Kaiparowits Plateau might contain important clues that would aid in answering questions in the archeology of the Southwest.

Location: Kaiparowits Plateau

Source: Utah Wilderness Coalition. Wilderness at the Edge. p. 147 and Lister, Florence C., Kaiparowits Plateau and Glen Canyon prehistory, an interpretation based on ceramics, 1964

Description: Fiftymile Mountain Archeological District contains more than 400 sites including Anasazi habitations and granaries. Important scientific value. Some of the most significant cultural resources in the Four Corners area. Archaeological District (47,325 acre) has been nominated to NRHP. Majority of sites are masonry structures (of 1-10 rooms). Most are of Virgin Anasazi origin but include sites attributed to Fremont, Hopi, and Paiute. Navaho are also expected of occupying the area. 4,000 total sites may be located in WSA.

Location: Fiftymile Mountain WSA

Source: Utah BLM Statewide Final Wilderness EIS, 1990

Description: Sixty-five sites have been recorded. They include lithic and ceramic scatters, masonry structures (granaries and storage cists), one rock shelter. Masonry and some lithic/ceramic associated with Virgin Anasazi/Virgin-Kayenta Anasazi. Two are Pueblo II-III time period. Some sites are associated with Paiute-age or Archaic-age peoples. At least 8 sites in this area are eligible for nomination to the NRHP.

Location: Wahweap WSA

Source: Utah BLM Statewide Final Wilderness EIS, 1990

Description: High concentration of prehistoric sites. Although surveys are incomplete for the Warm Creek unit more that 600 sites have been found ranging from lithic scatters and campsites to rockshelters.

Location: Kaiparowits Plateau/Warm Creek unit

Source: BLM, Kaiparowits power project environmental impact statement, 1976

Description: Part of a larger area extensively used by the Kayenta Anasazi and later the Southern Paiute Indians. Site densities expected to be moderate to high.

Location: Kaiparowits Plateau/Squaw Canyon unit

Source: ERT, 1980, Kaiparowits coal development and transportation study, final report

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Description: Prehistoric site densities are high on top of Nipple Bench. Sites represent Fremont, Virgin Anasazi and Kayenta Anasozi. The sites represent complex associations of features and artifacts and indicate permanent or extensive camps in rock shelters.

Location: Kaiparowits Plateau/Nipple Bench unit

Source: Fish, Paul, Preliminary Report Kaiparowits Power Project

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Description: Six sites have been recorded. One is Pueblo II Anasazi occupation site, with others unidentified.

Location: Burning Hills WSA

Source: Utah BLM Statewide Final Wilderness EIS, 1990

Description: One hundred-five sites (primarily lithic scatters) have been recorded covering a broad period of occupation. Ten rockshelters w/storage cists or storage caches, 1 w/masonry room, 3 w/granaries associated with Anasazi or Fremont have been discovered. Additional sites include petroglyph and pictograph panels associated with shelter sites and 1 burial site.

Location: Carcass Canyon WSA

Source: Utah BLM Statewide Final Wilderness EIS, 1990

Description: One hundred thirty-four documented sites represent virtually all known prehistoric cultures in southern UT (Archaic, Fremont, Anasazi, Southern Paiute). 8,000 years of prehistory are represented. The sites primarily represent temporary habitation by hunter gatherers..

Location: Death Ridge WSA

Source: BLM Utah Statewide Wilderness EIS, 1990, and Hauck, F.R., Cultural Resource Evaluation of South-Central Utah, 1977-1978

Description: The area contains 41 recorded sites and based on surveys may contain exceptionally high densities of sites.. Known sites include rockshelters, pit houses, lithic scatters, and masonry structures. Pictograph panels are in Deer Creek Canyon and petroglyphs are found in Snake Creek Canyon.

A study located and estimated 612 sites per 23,000 acres, 564 potentially eligible for nomination to the NRHP (southern border of WSA). Another inventory estimated 360 sites per 23,000 acres at the northern border of the WSA.

Location: Paria-Hackberry WSA

Source: Utah BLM Statewide Final Wilderness EIS, 1990

Description: The Kayenta Pueblo culture inhabiting the Straight Cliff and portions of the Escalante River drainage between A.D. 1000 and 1200 were likely in contact with the Fremont culture. Although both inhabited the area at the same time and competed for limited agricutural lands there is no evidence of open conflict during this time. Some modifications of pottery making techniques between the two cultures indicates that there was trade and exchange between them. Little is known positively about the Kayenta culture, and additional research in this area could provide valuable inshight on ineractions between the two cultures.

Location: Straingt Cliffs WSA

Source: Lister, Kaiparowits Plateau and Clen Canyon Prehistory: An interpretation based on ceramics. 1964.

Objects of Historic Interest

Description: Dance Hall Rock/Hole-in-the-Rock Trail. While the Hole-in-the-Rock Trail was under construction in 1879, Mormon Pioneers camped at Fortymile Spring and held meetings and dances in the shelter of Dance Hall Rock. Designated historical site by DOI 1970.

Location: Two miles west of the Glen Canyon NRA on the Hole in the Rock Trail

Source: Utah Wilderness Coalition. Wilderness at the Edge. - p. 182

Description: Historic route constructed in 1879 to provide access from Escalante to areas on the opposite side of the San Juan River in Southeast Utah.

Location: Historic trail running from Escalante to Hole in the Rock in Glen Canyon NRA

Source: Lambrechtse, Rudi. Hiking the Escalante, 1985

Description: Boulder Mail Trail. Used to carry mail between Escalante and Boulder beginning in 1902. Much of trail still visible where necessary to construct through slickrock. Nominated to NRHP. Popular backpacking route.

Location: Phipps-Death Hollow ISA

Source: Utah BLM Statewide Final Wilderness EIS, 1990

Description: Boynton Road. Constructed 1909 as short cut between Escalante and Salt Gulch. Abandoned after 2 years because of flooding. Visible over approx 9 of its 10 miles.

Location: Phipps-Death Hollow ISA

Source: Utah BLM Statewide Final Wilderness EIS, 1990

Description: Escalante-Boulder telephone line: First Boulder-Escalante telephone line constructed by Forest Service in 1911 providing first phone service to area. Still visible between Antone Flat and Sand Creek.

Location: Phipps-Death Hollow ISA

Source: Utah BLM Statewide Final Wilderness EIS, 1990

Description: Washington Phipps grave. A historical grave site of an early pioneer shot in 1878 in a dispute with his partner John Boynton. Provided the namesake for the area.

Location: Phipps Death Hollow

Source: Lambrechtse, Rudi. Hiking the Escalante, 1985

Description: Old Boulder Road. Main route between Escalante and Boulder until the CCC built Hell's Backbone Road and Highway 12 in 1930's to replace it.

Location: Phipps-Death Hollow ISA

Source: Utah BLM Statewide Final Wilderness EIS, 1990

Description: The Hattie Green mine, an early copper working located on the crest of The Cockscomb.

Location: The Cockscomb WSA

Source: Utah BLM Statewide Final Wilderness EIS, 1990

Description: Old Paria Townsite was established in 1874 on the bench above the eastern bank of the Paria River by Mormon settlers who attempted to farm the bottomlands. Site was abandoned in 1890.

Location: adjacent to Paria-Hackberry WSA

Source: Abby, Edward and Hyde, Philip. Slickrock p.46

Description: Old Paria Townsite movie set. Built in the 1960's to film several movies. Now abandoned but still a popular recreation destination.

Location: adjacent to Paria-Hackberry WSA

Source: Abby, Edward and Hyde, Philip. Slickrock p.46

Objects of Biological Interest

Description: Riparian zones are corridors for many of the region's species, including neotropical migrant birds. The corridors (including the Escalante, and Paria Rivers and Johnson Creek and their tributaries) bisect the region north to south, allowing for exchange of individuals among different animal populations. The importance of movement corridors to the long term viability of animal populations is of great scientific and management interest. This area would afford many opportunities to enhance this ecological issue.

Location: Entire monument proposal including the Escalante area, Kaiparowits Plateau, and areas west to Kanab including the Escalante, Paria rivers and Johnson Creek

Source: Edwards, Tom, 1996; Knopf, 1985; Armbruster and Lande 1993; Beier, 1993; Belovsky, 1987; Brown, 1971; Davidson et al. 1996; Diamond, 1981; Fahrig and Merriam, 1985; Frankel and Soule, 1981; Harris and Gallagher, 1989; Heaney, 1984; IUCN, 1978; Kushlan, 1979; Lomolino and Channell, 1995; Meffe and Carroll, 1994; Newmark, 1995; Noss, 1993; Patterson, 1984; Pickett and Thompson, 1978; Primack, 1993; Saunders et al., 1991; Shaffer, 1981; Soule, 1987; Soule and Wilcox, 1980; Wegner and Merriam, 1979; Wilcove et al., 1986; Willis, 1974.

Description: 25 miles of riparian corridor in unit. Connects mountains to desert lowlands. Has great concentration of hanging gardens and riparian vegetation, including relictual populations in canyon bottoms. Also supports many rock crevice communities. Connects other protected areas. High plant endemism, due to large extent of parent material exposure.

Location: Escalante River

Source: BLM Wilderness EIS; Knopf, 1985; Shulz, 1993; Armbruster and Lande 1993; Beier, 1993; Belovsky, 1987; Brown, 1971; Davidson et al. 1996; Diamond, 1981; Fahrig and Merriam, 1985; Frankel and Soule, 1981; Harris and Gallagher, 1989; Heaney, 1984; IUCN, 1978; Kushlan, 1979; Lomolino and Channell, 1995; Meffe and Carroll, 1994; Newmark, 1995; Noss, 1993; Patterson, 1984; Pickett and Thompson, 1978; Primack, 1993; Saunders et al., 1991; Shaffer, 1981; Soule, 1987; Soule and Wilcox, 1980; Wegner and Merriam, 1979; Wilcove et al., 1986; Willis, 1974.

Description: Riparian corridor links high country to lowland desert scrub. Connects protected areas. Has high concentrations of isolated communities: hanging garden, rock crevice and canyon bottom communities. Also has an abundance of packrat middens.

Location: Paria River

Source: Van Devender and Spaulding, 1979; BLM Wilderness EIS; Knopf, 1985; Shulz, 1993; Armbruster and Lande 1993; Beier, 1993; Belovsky, 1987; Brown, 1971; Davidson et al. 1996; Diamond, 1981; Fahrig and Merriam, 1985; Frankel and Soule, 1981; Harris and Gallagher, 1989; Heaney, 1984; IUCN, 1978; Kushlan, 1979; Lomolino and Channell, 1995; Meffe and Carroll, 1994; Newmark, 1995; Noss, 1993; Patterson, 1984; Pickett and Thompson, 1978; Primack, 1993; Saunders et al., 1991; Shaffer, 1981; Soule, 1987; Soule and Wilcox, 1980; Wegner and Merriam, 1979; Wilcove et al., 1986; Willis, 1974.

Description: Fifty miles of perennial streams including the Paria River (which is a wild and scenic river inventory segment). Riparian vegetation covers 500 acres.

Location: Paria-Hackberry WSA

Source: Utah BLM Statewide Final Wilderness EIS, 1990

Description: Three major floras meet in this area. Plants from the Mojave, Arizona deserts and northern Utah are all found here, with a few species from the Great Plains. The Colorado Plateau is surrounded by high mountains, isolating the flora and fauna. Unlike many ecosystems, the plant density, diversity and stature within the monument is determined more by substrate than climate. Consequently, isolation, plus the great diversity of substrates (providing a wide range of soil chemistry and physical characteristics) found within close proximity to each other has resulted in a high level of plant endemism in this area. Eleven species found in the monument are found nowhere else in the world. Of plants that occur only in Utah or on the Colorado Plateau, 125 species occur in the monument. The Canyonlands portion of the Colorado Plateau, much of which is contained in the monument, is considered the richest floristic region in the Intermountain West, and contains 50% of Utah's rare and endemic plants. 90% of these rare and endemic species are found on substrates typical of most of the monument. Of the Canyonlands area, the monument area is considered one of the most significant for endemic populations, with more than 10% of the flora being found no nowhere else.

Of additional significance is that many of the plants in the monument are diploid species. This means they represent the basic genetic stock from which polyploid species in the area evolved. This makes this area of great significance to plant evolutionary biologists and provides a unique opportunity to study the evolution and speciation of plant species, as well as the structure and dynamics of plant communities, independent of climate.

Location: Entire monument

Source: Kaiparowits Power Project EIS; Axelrod, 1960; Utah Natural Heritage Program plant database; Nabhen and Wilson, 1996; Shulz, 1993; Albee et al., 1988; Welsh, 1974; Welsh et al. 1975; Hintze, 1988; Dott, 1996; Shreve, 1942; Cronquist et al., 1977; Utah Natural Heritage Program plant database

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Description: The Colorado Plateau was uplifted and downcut without deformation. As a consequence, large areas of unmixed geologic parent materials are exposed, and plants must adapt to large array of highly distinct parent materials. These substrates are sharply demarcated, and often occur within a few meters of each other. This situation offers the unique opportunity to examine the role of soil physical and chemical characteristics in determining plant and animal community structure independent of climatic variables, an important ecological question. It also results in different plant community structure and dynamics than is generally observed in other ecosystems. This area contains shales, siltstones, mudstones, sandstones and limestone of differing depths, and deposited in a variety of environments (marine, freshwater and eolian). Each soil depth and depositional environment has very different chemical and physical characteristics. As a result, there is a great diversity of substrates in this area, each supporting a unique plant community.

Location: Entire monument

Source: Hintze, 1988; Nabhen and Wilson, 1996; Gross, 1987; Dott, 1996; Roberts, 1987

Description: The presence of steep elevational gradients gives the opportunity to sort out the role of temperature and precipitation in structuring plant and animal communities. Elevational gradients have traditionally been used by scientists as a way of examining factors controlling biotic community structure. Juxtaposition of diverse substrates and elevational gradients gives an unparalleled opportunity to determine the respective roles of soil chemistry, physical characteristics, elevation, rainfall and temperature in structuring biotic communities. In addition, it allows for high biodiversity in a small area.

Location: Entire monument

Source: Kaiparowits Power Project EIS; Axelrod, 1960; Utah Natural Heritage Program plant database; Nabhen and Wilson, 1996; Shulz, 1993; Albee et al., 1988; Welsh, 1974; Welsh et al. 1975; Hintze, 1988; Dott, 1996; Shreve, 1942; Cronquist et al., 1977

Description: The Escalante Plateau is the home to approximately 300 species of amphibians, birds, mammals, and reptiles. This diverse set of wildlife species includes over 20 species of birds of prey including the bald eagle, peregrine falcon, and was the historical range of the condor. The region contains 2 of the 7 recognized centers of endemism for fishes of the western United States.

Location: Escalante Plateau

Source: Davidson et al. 1996; Tom Edwards, 1996, Behnke, R.J., and Zar, M., 1976

Description: Contains many different geologic substrates (therefore soils with different physical and chemical attributes) in a small area. The majority of endemic in Utah are found on these particular substrates; consequently, this area is expected to have a high concentration of endemics.

Location: Escalante -along boundary of Glen Canyon NRA and Capital Reef National Park

Source: Utah Natural Heritage Program plant database; Nabhen and Wilson, 1996; Shulz, 1993; Albee et al., 1988; Welsh, 1974; Welsh et al. 1975; Hintze, 1988

Description: Large expanses of fine-textured soils (Morrison, Mancos/Tropic) shales support large number of endemic plant species, fossils.

Location: Henrieville to Escalante

Source: Hintze, 1988; Shulz, 1993; BLM Wilderness EIS

Description: An exposed monocline with many soils/substrates in close juxtaposition provides tremendous biodiversity of both general and endemic flora. High salt content of stream provides habitat for salt-tolerated riparian plants. Provides a elevational gradient from ponderosa pine to desert scrub. In addition, the rocky substrate has provided refugia for many Arcto-Tertiary plants, providing a unique opportunity to examine the effects of ancient floral presence in the structuring of present-day plant communities. This area also supports a very high diversity of both general and endemic flora.

Location: The Cockscomb

Source: Hintze, 1988; Shulz, 1993; Albee et al., 1988; Axelrod, 1960; Welsh, 1978; Stevens, 1992; Dott, 1996;

Description: Contains a concentration of many different geologic substrates/soils with different physical and chemical attributes. This area has a high concentration of endemics. This boundary also abuts protected areas (Glen Canyon, Capitol Reef), thereby effectively increasing the value of all three areas for biological conservation. In addition, the Waterpocket Fold has isolated two outcrops of the same parent material. These two areas now support different floras. This presents an outstanding scientific opportunity to explore processes of speciation.

Location: Far eastern boundary

Source: Hintze, 1988; Shulz, 1993; Albee et al., 1988; Axelrod, 1960; Welsh, 1978; Stevens, 1992; Dott, 1996; Armbruster and Lande, 1993; Fahrig and Merriam, 1985; Beier, 1993; Belovsky, 1987; Brown, 1971; Davidson et al, 1996; Diamond,

1981; Frankel and Soule, 1981; Harris and Gallagher, 1989; Heaney, 1984; IUCN, 1978; Kushlan, 1979; Lomolino and Channell, 1995; Meffe and Carroll, 1994; Newmark, 1995; Noss, 1993; Patterson, 1984; Pickett and Thompsón, 1978; Primack, 1993; Saunders et al., 1991; Shaffer, 1981; Soule, 1987; Soule and Wilcox, 1980; Wegner and Merriam, 1979; Wilcove et al., 1986; Willis, 1974.

Description: This is an exposed monocline. Consequently, many substrates (Summerville, Morrison, Dakota, Tropic, Entrada, Navajo, Wingate and Carmel) are exposed directly next to each other, providing an opportunity for studies of ecological processes independent of climate. This monocline also has an elevational gradient, facilitating the study of effects of temperature and moisture on community dynamics. In addition, the rocky substrate has provided refugia for many Arcto-Tertiary plants, providing a unique opportunity to examine the effects of ancient floral presence in the structuring of present-day plant communities. This area also supports a very high diversity of both general and endemic flora.

Location: Straight Cliffs area

Source: Hintze, 1988; Shulz, 1993; Albee et al., 1988; Axelrod, 1960; Welsh, 1978.

Description: Diversity of plant life ranging from low desert shrub to Ponderosa Pine (less that 1 mile apart)enhances the study and observation of ecology. 3 small stands of Ponderosa pine in Alvey Wash.

Location: Death Ridge WSA

Source: Utah BLM Statewide Final Wilderness EIS, 1990

Description: Contained within the monument are 3-5 spatially separated areas where the same substrates are exposed in close proximity to each other. In addition, there are 5 elevational gradients along riparian corridors. This is critical for replicated scientific work to be conducted.

Location: Entire monument

Source: Hintze, 1988; USGS Topographical Maps

Description: Riparian corridor with elevational gradient, connecting desert low lands to the high country. Vermillion, White, Pink Cliffs (Triassic, Jurassic, Cretaceous material).

Location: Johnson's Creek

Source: Hintze, 1988; USGS Topographical Maps; Beier, 1993; Noss, 1992, 1993

Description: Fifty Mile Mountain. Presence of aspen on Pleasant Grove, Steer Canyon, and Pinto Mare Canyons.

Location: Fifty Mile Mountain WSA

Source: Utah BLM Statewide Final Wilderness EIS, 1990

Description: Protects lands at low elevation sites frequently rich in species diversity. The range of elevation in these areas from approximately 4500-8300 feet encompasses a wide variation in elevation and will capture the full diversity of plant and animal species in the region.

Location: Entire monument proposal including the Escalante area, Kaiparowits Plateau, and areas west to Kanab

Source: Hintze, 1988; Utah BLM Final Wilderness EIS, 1990

Description: The monument contains an abundance of hanging gardens, tinajas, canyon bottom, dunal pockets, salt-pocket and rock crevice communities. These small, isolated populations often contain unusual, often relictual plants and animals. Hanging gardens and canyon bottom communities harbor riparian plants and their pollinators, as well as unique vertebrates (bats and small mammals) and soil fauna. Tinajas are important aquatic resources, and contain a diverse array of tadpole, fairy and clam shrimp, amphibians, algae, water beetles, other crustaceans, snails, mosquito and gnat larvae and aquatic/riparian plants. Highly saline areas are found around many seeps and streams, and consist of plants and animals adapted to highly saline conditions. Dunal pockets contain species adapted to shifting sands, while rock crevice communities consist mostly of slow-growing species that can thrive in extremely infertile sites. These communities offer a chance to examine gene flow dynamics, and to distinguish the respective role of pollen versus seeds. They offer an opportunity to study ground water flow dynamics in the absence of significant fluvial processes, and island biogeography of plants, pollinators and ground-dwelling biota. They also are highly simplified, discrete ecosystems, making them ideal for elucidating basic ecosystem processes.

Location: Entire monument

Source: Nabhen and Wilson, 1996; Harper et al., 1994; Welsh et al., 1993; May et al., 1995; Fowler et al., 1995; Graff, 1988

Description: These canyons provide a high concentration of isolated, unique plant and invertebrate communities: hanging garden, rock crevice, and canyon bottom communities. Many relictual plant species can be found in these communities. Pack rat middens are abundant, providing paleoclimate and paleo-vegetation information.

Location: Escalante Canyons

Source: Axelrod, 1960; BLM Wilderness EIS; Van Devender and Spauling, 1979; Fowler et al., 1995; Nabhen and Wilson, 1996

Description: Dunal pockets contribute Great Plains species to the flora. These are unique, isolated plant communities.

Location: Cockscomb to Kaiparowits

Source: Hintze, 1988

Description: Unique, isolated communities are located throughout the monument. These include hanging gardens, tinajas, canyon bottom, dunal pocket, salt pocket and rock crevice communities. They provide great opportunities for examining evolution, gene flow, island biogeography and other ecological principles.

Location: Entire monument

Source: Case and Cody, 1988; Diamond, 1981; Dott, 1996; Harris, 1984; Ludwig and Whitford, 1981; Fowler et al., 1995; Nabhen and Wilson, 1996; Roberts, 1987; Reice, 1994; Axelrod, 1960

Description: Biological conservation theory and literature suggests that large contiguous conservation areas increase both extent and probability of population survival, increases protection of migratory pathways, and is the most effective means of conserving aquatic and riparian communities.

Location: Entire monument

Source: Soule, 1987; Davidson et al., 1996; Miller, 1961; Minckley and Deacon, 1968; Armbruster and Lande, 1993; Fahrig and Merriam, 1985; Beier, 1993; Belovsky, 1987; Brown, 1971; Davidson et al. 1996; Diamond, 1981; Frankel and Soule, 1981; Harris and Gallagher, 1989; Heaney, 1984; IUCN, 1978; Kushlan, 1979; Lomolino and Channell, 1995; Meffe and Carroll, 1994; Newmark, 1995; Noss, 1993; Patterson, 1984; Pickett and Thompson, 1978; Primack, 1993; Saunders et al., 1991; Shaffer, 1981; Soule, 1987; Soule and Wilcox, 1980; Wegner and Merriam, 1979; Wilcove et al., 1986; Willis, 1974.

Description: The connection with Glen Canyon provides a larger protected area. It also provides low desert vegetation as part of the vegetational gradients. Large areas are important for maintaining the evolutionary potential of plants and animals, allowing for the exchange of genetic material among the separate populations that constitute a population.

Location: Common boundaries and riparian connections with Glen Canyon NRA, Capitol Reef NP, Box Hollow Wilderness and Paria Wilderness

Source: Hintze, 1988; Shulz, 1993; Albee et al., 1988; Axelrod, 1960; Welsh, 1978; Stevens, 1992; Dott, 1996; Armbruster and Lande, 1993; Fahrig and Merriam, 1985; Beier, 1993; Belovsky, 1987; Brown, 1971; Davidson et al. 1996; Diamond, 1981; Frankel and Soule, 1981; Harris and Gallagher, 1989; Heaney, 1984; IUCN, 1978; Kushlan, 1979; Lomolino and Channell, 1995; Meffe and Carroll, 1994; Newmark, 1995; Noss, 1993; Patterson, 1984; Pickett and Thompson, 1978; Primack, 1993; Saunders et al., 1991; Shaffer, 1981; Soule, 1987; Soule and Wilcox, 1980; Wegner and Merriam, 1979; Wilcove et al., 1986; Willis, 1974.

Description: Cryptobiotic soil crusts are critical for soil stability, nutrient availability for vascular plants and normal soil surface temperatures. These crusts are extremely fragile and easily disrupted by soil surface disturbances such as trampling or off-road vehicles. Since the soils in the monument are highly susceptible to erosion, it is important that these biocrusts be protected so they stabilize these erodible soil surfaces. In addition, these ecosystems have few nitrogen-fixing plants. Since these crusts provide nitrogen to these soils, they are a critical part of these nitrogen-limited ecosystems.

Location: Entire monument

Source: Belnap, 1994, 1995; Belnap and Harper, 1995; Belnap et al., 1994; Jefferies, 1989; Harper and Marble, 1988; Johansen, 1993; Mack and Thompson, 1978; Fleischner, 1994

Description: Disturbance of most soil surfaces in the monument area will result in soil surface temperature changes, as bio-crusted surfaces are darker than the substrates underneath them. The expected lowering of temperature with disturbance would result in cooler soil temperatures, and thus later spring plant germination and lower nutrient uptake rates. This may adversely effect desert plant growth in early spring. Surface temperatures also influence foraging and burrowing patterns for many soil invertebrates, and many effect community dynamics of these species.

Location: Entire monument

Source: Ludwig and Whitford 1981; Belnap 1995

Description: Ecosystems in this area are some of the most stable documented to date, as both large and small scale disturbances are limited spatially and temporally. Very little of this area was glaciated in the Pleistocene. Most plant communities evolved without fire or grazing by large ungulate herds, as evidenced by characteristics of the soils and the flora. Catastrophic events are minimal, with the exception of wash bottoms. Microsite disturbances are minimal as well, as most soils support very low populations of invertebrates. 1880

photos repeated in 1990 show many sites virtually unchanged, with the same tree, shrub and grass individuals present, indicating very low species turnover rates in this region relative to other ecosystems. In addition, dead tree branches can still be found in virtually the same condition as they were 100 years ago, indicating plant tissue decomposition rates are extremely low in this region. This makes this area highly unique, as most ecosystems are believed to be structured disturbance. In this region, ecological processes can be studied independent of the effects of disturbance to give us greater insight into their functioning (i.e. factors controlling exotic plant invasions, species-species interactions, etc.)

Soil physical, chemical and biological features appear to be both easily damaged (low resistance) by surface disturbance and have very slow recovery rates (low resilience) when compared to other deserts or more mesic systems . This may be a result of evolution of this ecosystem evolving in the relative absence of disturbance (Belnap 1995, 1996). Therefore, this area is important in the study of how disturbance influences community dynamics, including species-species interactions, and for understanding how to restore these fragile systems. This also means that this area is highly susceptible to damage by different land uses, including recreation and grazing.

Location: Entire monument

Source: Belnap, 1995, 1996; Belnap et al., 1994; Mack and Thompson, 1982; Fleischner, 1994; Kleiner and Harper 1972; Harper et al., 1994; Webb, 1994; Rogers, 1982; Pickett and White, 1985; Moldenke, 1995; Evans and Ehleringer, 1993; Turner et al. 1993; Iverson et al. 1981; Webb and Wilshire 1981; Larsen 1996; Bowers et al. 1994

Description: Isolation of this area has resulted in minimal human impacts. Many of the ecosystems found in this area have received little, if any, human use and the type and extent of disturbance has that has occurred is known. In addition, there are large areas unbroken by roads. This is essential to the protection and conservation of plant and animal species.

Location: Entire monument

Source: Wilcox et al 1986; Wilcox and Murphy 1985; Mader et al., 1990; Osley, et al., 1974; Rost and Bailey, 1979; Witmer and Calesta, 1985

Description: The monument lacks any areas that have been invaded to any large extent by exotic species. There are few such areas in the Intermountain West, and they can provide invaluable information in understanding the ecology and dynamics of exotic plant invasion. These areas aid scientists in understanding what makes systems resistant to such invasions, and thus help land managers predict what areas are susceptible to invasion and restore already-invaded regions.

Location: Entire monument

Source: Billings, 1994; Fleischner, 1994; Forcella and Harvey, 1983; Gross, 1987; Hunter, 1990; Loope et al., 1988; MacMahon, 1987; Pellant and Hall, 1994

Description: Six threatened or endangered candidate species are located within or near this area.

Location: Wahweap WSA

Source: Utah BLM Statewide Final Wilderness EIS, 1990

Description: Contains Peregrine falcon (endangered) and 6 special status animal species and 5 special status plant species.

Location: Mud Spring WSA

Source: Utah BLM Statewide Final Wilderness EIS, 1990

Description: Habitat for Swainson's hawk, golden eagle (Sensitive) and peregrine falcon (endangered).

Location: The Blues WSA

Source: Utah BLM Statewide Final Wilderness EIS, 1990

Description: Peregrine falcon and bald eagle (endangered). 8 animal and 5 plant species of special status.

Location: Paria-Hackberry and Cockscomb WSA and Wahweap WSA

Source: Utah BLM Statewide Final Wilderness EIS, 1990

Description: Thirteen species of raptors are known or suspected of nesting in the WSA

Location: Burning Hills WSA

Source: Utah BLM Statewide Final Wilderness EIS, 1990

Description: Relict plant community in the upper part of Dry Valley "probably possesses important scientific values"

Location: Mud Spring Canyon WSA

Source: Utah BLM Statewide Final Wilderness EIS, 1990

Description: Unique relict plant community of pinion-juniper and sagebrush-grass park vegetation accessible only by a steep trail. One of the few remaining unaltered plant communities in Utah. No Man's Mesa RNA was designated as an ACEC in 1986. Such areas are invaluable to science. They provide restoration and management goals for administration of lands. Such areas are also critical to scientists who are trying to understand the natural functioning of ecosystems. Grasslands are especially valuable, as almost all have been heavily grazed for over a century.

Location: Paria-Hackberry WSA (No Man's Mesa and Little No Man's Mesa)

Source: Utah BLM Statewide Final Wilderness EIS, 1990 and Kleiner and Harper, 1972

Description: Four Mile Bench Old Tree Area. Unique area of extremely old (1,400 years) pinon and juniper trees. Unique scientific values on over 1,000 acres.

Location: Wahweap WSA

Source: Utah BLM Statewide Final Wilderness EIS, 1990

Description: This region is at the northern end of areas that receive summer monsoonal rains, and is at the southern end of areas that depends on winter rains. This distinction is very important to the physiological functioning of plants in this moisture-limited areas, as even minor changes in temperature and/or rainfall may lead to major differences in water availability, and consequently, plant metabolic processes. Climate change is expected to alter both rainfall timing and amount, as well as temperature. This, in turn, would alter plant physiology, water use patterns and community composition in this

region, making the monument an excellent place for studying global climate change.

Location: Entire monument

Sources: Ayyad 1981; Graff 1988; Van Devender and Spaulding 1979; Wagner 1981

Description: Unlike most deserts that are primarily depositional environments, the CP is an erosional one (Welsh 1979; Nat Hist). This contributes to high endemism, as substrate material is not mixed. In addition, it makes this region highly susceptible to soil loss when surfaces are disturbed. This soil loss has a negative impact on plant and aquatic communities, as well as dam sediment loads.

Location: Entire monument

Source: Welsh, 1979; Harper et al., 1994

Description: The effects of scaling up and down are not known for many ecological processes. The multitude of variably sized, discrete watersheds found in this area offer a unique opportunity to test the effects of scaling for hydrological and biological processes. In addition, the close spacing of these watersheds offers a chance to separate the effects of area per se from other environmental factors on community structure.

Location: Entire monument

Source: Allen and Hoekstra 1987; Reice 1994; Pickett and White 1985; Rosenweig 1985

Description: Semi-arid and arid lands of the western United States are highly susceptible to desertification. The lack of natural disturbance in much of this area offers the opportunity to study the effects of different types and levels of land use and to better understand the steps leading to desertification.

Location: Entire monument

Source: Dregne, 1983

Description: This area contains few exotic plants. Having this resource gives the opportunity to better understand what factors inhibit or facilitate exotic plant invasions. Roads have been heavily implicated in facilitating exotic plant invasion, while intact Cryptobiotic soil crusts and less favorable soil chemistry may inhibit such an invasion. Invasion could fundamentally alter these communities, by altering species composition, community dynamics and fire cycles.

Location: Entire monument

Source: Monsen and Kitchen, 1994; Kelly 1996; Harper and Marble 1988; Davidson et al. 1996

Description: Quaternary resources are abundant in the monument. Pack rat middens enable reconstruction of paleoclimates and paleo-vegetation, while Pleistocene animal remains found in alcoves.

Location: Entire monument

Source: Harper et al., 1994

Description: Unlike more mesic ecosystems, there is little evidence that desert communities demonstrate traditional successional sequences. There is little or

no modification of soils or other site characteristics by previous-occurring plants. Understanding of this is important for restoration efforts. The monument offers an excellent opportunity to study this phenomenon independent of climate and disturbance factors.

Location: Entire monument

Source: Barbour, 1981; MacMahon, 1987; Shreve, 1942; Dott, 1996

Description: Peregrine falcon and Bald Eagle use these areas. Areas are habitat for 7 plant and 9 animal species considered sensitive.

Location: Death Ridge and Fifty Mile Mountain WSAs

Source: Utah Statewide Wilderness Study Report, 1991

Description: Peregrine falcon and Bald Eagle use these areas. Areas are habitat for 8 plant and 7 animal species considered sensitive.

Location: Phipps Death Hollow ISA and Steep Creek WSA

Source: Utah Statewide Wilderness Study Report, 1991

Description: Peregrine falcon and Bald Eagle use these areas. Areas are habitat for 9 plant and 7 animal species considered sensitive.

Location: North Escalante Canyon, The Gulch and Carcass Canyon WSAs

Source: Utah Statewide Wilderness Study Report, 1991